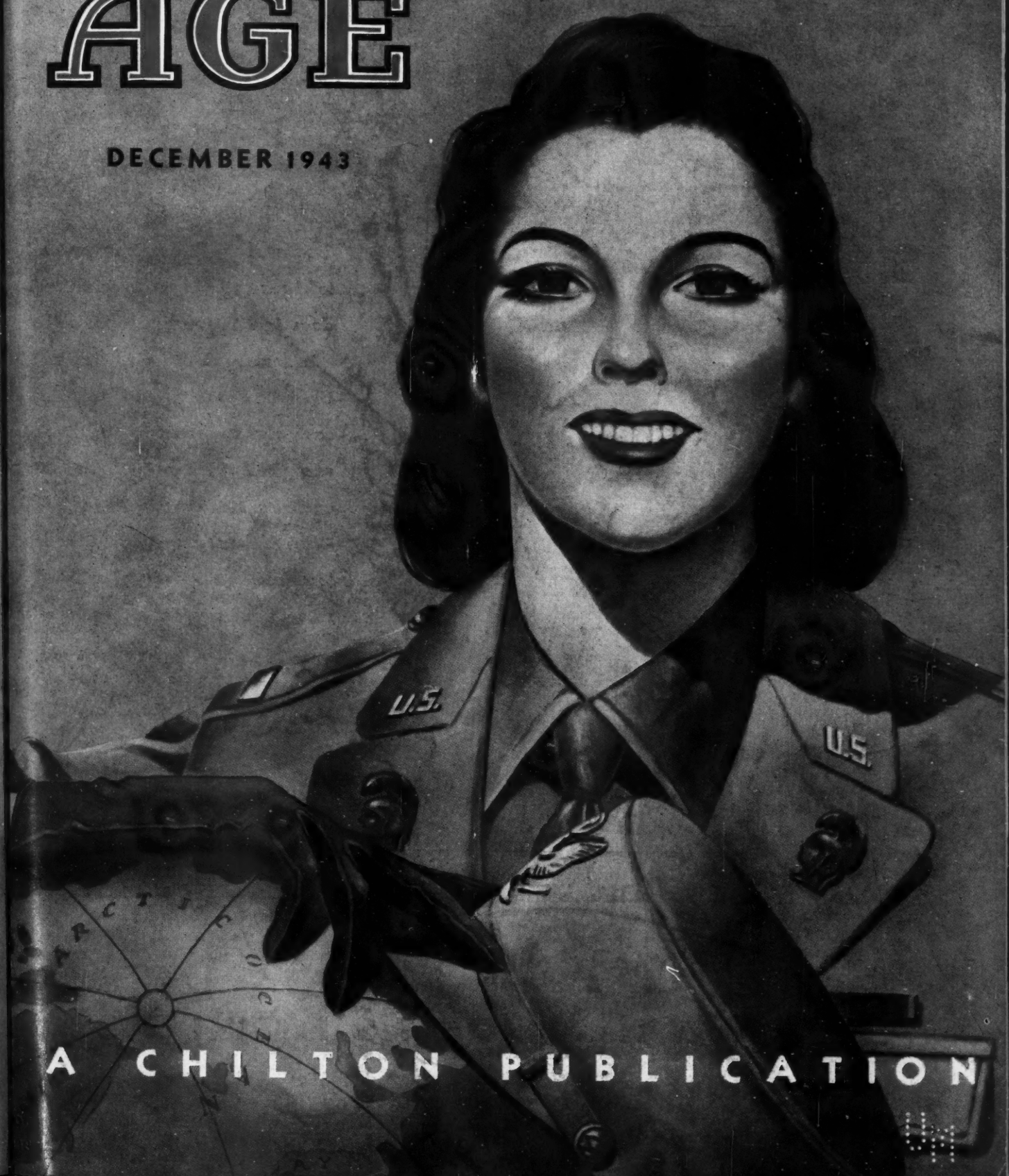


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MOTOR AGE

DECEMBER 1943



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Engine Lib.



Have crankshaft reground
if necessary.



Examine every moving part
while the engine is down.

✓ rods  and bearings 

✓ pistons , pins  and

rings . ✓ valves 

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BY CAR AND TRUCK OWNERS

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Successful repair shops the country over are using this plan which calls for a complete examination of every moving part.

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There's a Landis-Equipped jobber near you. If you can't locate him, ask us to send you his name and address.

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418

Regrind **CRANKSHAFTS**



The
Sign of a
LANDIS
-Equipped
JOBBER

Precision Grinding
as done by a
Landis-Equipped
Shop means the
duplication of
original factory
accuracy.

Landis grinders
can recondition
crankshafts with
precision because they
are similar to
the machines that are
used by most
manufacturers.

Be sure your
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reground for
precise accuracy
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Simple To Use—Practical—Complete.

Furnished now to the Armed Forces—To Service Stations when the Victory's Won.

KEEP BUYING BONDS

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TEST BENCHES ENGINE ANALYZERS BATTERY CHARGERS MAGNETO TESTERS ELECTRICAL TESTING & SERVICE EQUIPMENT

MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL

FOR AUTOMOTIVE SERVICEMEN

Vol. LXIII, No. 1

December, 1943

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SLANTS ON THE NEWS

94 Per Cent of Owners Refuse to Lay Up Cars

AS shown by the MOTOR AGE estimate of 1943 motor vehicle registrations, which is detailed on another page in this issue, 94 per cent of the passenger cars that were in operation when the year opened are still serving the nation and nearly 97 per cent of the trucks are still on the road.

These figures could be used to prove many things. They could refute the alarmists who saw 10,000,000 or more cars being forced from the road during the year. They could be cited as proof that servicemen have mastered the numerous difficulties created by war conditions to keep cars in running order in spite of manpower and parts shortages.

Yet it is probable that the figures indicate something even more important. That is, Americans will go to almost any lengths to keep and operate their automobiles, not merely because they like automobiles but because they need them, a truth government agencies are slowly coming to realize after two years of war.

Ford to Build Cargo Plane At Willow Run After War

FIRST automobile manufacturer definitely to commit himself to entry into the airplane business after the war is Henry Ford, who announced recently that the Ford

Motor Co. planned to build huge multiple-engine passenger-cargo planes at Willow Run when hostilities cease. The project has been under way in the company's post-war plans for some time and scale models already have been built.

"Although we have not been able to give any great amount of time and effort to the project because of all-out war production," said Ford, "we have been experimenting with small models and engines. There will be some new ideas in our design. I cannot say much about it yet because it is not complete, but we are trying to design a plane which will not need such tremendously long runways for take-off and landing—a plane which can be operated at a fraction of the cost now necessary for flying big planes, and which will be positively as safe as it is possible to make it."

"The government has given us first option on Willow Run for post-war use and we plan to take up the option."

Ford is no novice in the airplane transport field. Back in 1925 Ford bought out the Stout Metal Plane Co., which had been founded by William B. Stout, and made it the Stout Metal Airplane Division of Ford Motor Co. A tri-motor plane powered by three Wright J-4 air-cooled engines was produced in 1925 as the predecessor of the famed Ford "tin geese." From 1926 to 1929 Ford built 135 tri-motor transport planes.

Why Term It Progress If a Tire Crisis Looms?

PROGRESS REPORT NO. 4 by the rubber director is remarkable for the light it sheds on the ways of bureaucratic management. The previous report, made when William M. Jeffers was still at the helm, had logged remarkable progress in synthetic-rubber production. Now, six months later, the new report points out numerous shoals and reefs that threaten to wreck the tire program. It is somewhat odd that such a gloomy about-face should be included in a "progress" report.

The reason becomes apparent on close reading of the report. Nowhere does it declare that the goal of 30,000,000 passenger-car tires, set by Jeffers for next year, will not be reached. It does, however, assert that the tire industry cannot produce enough truck tires to avert a crisis.

The experience of truck men supports the report's warning that a crisis in tire supply lies ahead. Synthetics, as now constituted, are

How important are the contributions of car dealers to the war effort? In the case of the dealer whose story begins on Page 20, they have been important enough to win the firm the coveted Army-Navy "E" for war production.

not practicable in the larger tires. They heat too much and wear too rapidly. Production of big casings must be paced to the amount of crude that can be made available from our dwindling stock pile. The sternest conservation measures are necessary to avert a breakdown of highway transport.

So far as passenger-car tires are concerned, the report seems unduly pessimistic. It shows that even 30,000,000 tires next year would not be exactly a windfall, since we produced more than 50,000,000 tires in the last peacetime year. We produced that number of tires, but only 39,000,000 were for replacement. Furthermore, they were built for 29,500,000 passenger cars averaging 7500 miles a year at comparatively high speeds. For today's 25,000,000 passenger cars, 30,000,000 replacement tires a year, even if built of synthetic, would seem to be adequate, particularly when it is recalled that 75 per cent of these vehicles are limited to an A ration book or 2 gal. of fuel per week.

It can be inferred from Report No. 4 that Jeffers was responsible for the present tire situation. Lack of tire-making facilities, labor shortage and behind-schedule rayon and cotton-cord programs all existed when Jeffers was rubber director. Although the theme has been taken up by many critics, the fact remains that Jeffers alone kept the military from stalling the synthetic-rubber program and kept a powerful farm bloc from scuttling the rayon-cord program.

Ideas Can Be Too Bad, Even for Washington

SOME of our global thinkers have developed a proposal which would attempt to conserve manpower and replacement parts by regulation of maintenance procedures. Presumably, it would be enforced, if adopted, by control of the replacement parts. This proposal would stipulate, for instance, the amount of taper in a cylinder before it would be permissible to

recondition it and fit a new piston. Below a set standard, expander-type rings would have to do.

As originally set up, it would require reconditioning one cylinder at a time in an engine, if one cylinder wore faster than its mates. Under this plan such parts as valve guides would have to wear to legal limits before they could be replaced. The proposal might be something to get excited about if it had a chance of adoption but indications are that it is getting scant sympathy even in the preliminaries, which is probably more than it deserves.

Truck Program Promises To Help Civilian Scarcity

ALTHOUGH civilians have been disappointed since war began to learn that official hopes and expectations seldom meant more civilian goods, the tone of the WPB announcement that the truck quota for 1944 has been quadrupled is fairly convincing. The revised program calls for 123,492 trucks of all claimant agencies aside from purely military demands. The Army, which hitherto has insisted on getting its vehicles regardless, has now agreed that any cutback in the program will be shared equally by the military and the other claimants.

The share of ODT, which represents all civilian demands, amounts to 81,366 vehicles. Although a pitifully small number of trucks have actually been built during the last six months of this year out of the original quota of 7500, R. L. Vani-man, director of the WPB Automotive Division, declares: "We fully expect to realize the entire program." It was indicated that the first trucks under the revised schedule would start coming off production lines soon after the first of the year.

One difficulty, now being discussed in Washington, is tires. The latest rubber report makes it clear that sufficient truck tires cannot be made even for replacements, so the problem of equipping new trucks becomes extremely bothersome.

Wishful Tipsters See Victory Cars by Spring

ALTHOUGH certain Washington officials are busily denying the possibility, tipsters are as busily spreading talk that "victory model" passenger cars will be in production by spring. The plan, according to those claiming pipelines to important Washington sources, is to have Ford, Chevrolet and Chrysler build the cars on the lines now devoted to truck production. The avowed reason for such a step, it is said, is to get civilian goods moving as soon as possible, to lessen the shock of post-war conversion. The only obstacle to introducing the plan, say the gossips, is the momentary inability to obtain certain needed materials.

Opposed to the view that passenger-car production can be resumed in the near future is the undeniable fact that all existing truck facilities are unable to build enough trucks for the armed services, let alone turn out enough to satisfy the crying civilian need.

Reconversion Will Take More Than Magic Wand

WHEN trying to estimate post-war conditions in the automotive industries, many men seem to be of the belief that all military production will stop on a certain day and factories will start work immediately on the production of civilian goods. Actually, the change-over to peacetime production will be probably far different. A better idea of what will probably happen will be gotten by considering what occurred when the nation was mobilizing.

We started mobilizing our Army in the fall of 1940 (more than a year before Pearl Harbor) and we are still in the process of mobilizing. Industry started to convert to the manufacturer of war goods even before that date and one factory after the other got a war contract of some sort. The return to the production of civilian goods probably will be similar and will extend over a long period.



SLANTS ON THE NEWS

That is why it is so difficult to forecast when new cars will reach the public. If a car factory should get the all-clear, passenger-car production could not be resumed until all its suppliers, the parts and accessory manufacturers would be in a position to produce the required parts. It is certainly difficult to believe that all car factories will be in a position to resume civilian production simultaneously.

Official Change of Mind On Value of Synthetic

IN connection with tire prospects, it is enlightening to note the change of heart that has occurred in official estimates of the quality of synthetic rubber.

A survey of synthetic rubber issued by the Interior Department a few months ago asserted, among other things, that Buna S synthetic was as good as natural rubber or better, with respects to its resistance to wear. Now the fourth report of the rubber director declares that synthetic is inferior to natural rubber, that Buna S, from which passenger-car tires are being made, is only 90 per cent as good, and can be expected to give that percentage of service only when properly inflated, not overloaded, not abused and driven on "smooth" roads. What its life would be under ordinary driving conditions is anybody's guess.

If this evaluation of synthetic rubber be correct, then the country was badly oversold on synthetic in months past. Was this done simply to build morale or did officials talk before they thought?

Constant marking down of synthetic's value does not forecast a rosy future. The country's plants are supposed to produce 818,200 long tons of synthetic next year, compared with our normal peacetime consumption of 600,000 long tons of natural crude. This looks promising until you estimate the wearing quality of synthetic at, say, 60 per cent of natural rubber. Then you discover that, measured by the equivalent in crude, we shall have only 490,920 tons.

New World Already Here —Parts Maker Buys Parts

PARTS continue to grow scarcer and a deep gloom seems to have settled over the agencies in Washington which have to do with the production and distribution of parts. For some time after shop operators had convinced us that parts were hard to get, these agencies denied that there was any shortage. Now they admit it, but there does not seem to be any method of relieving it, even on paper.

One unusual development in the parts picture is a deal now cooking whereby a vehicle manufacturer who once bought parts from a parts manufacturer is planning to make them for the parts manufacturer. The parts manufacturer is so loaded up with military orders that he cannot handle any more civilian production. One of his customers, apparently feeling a cut-back in military schedules, has found men, material and facilities to help out.

WPB Increases Pressure On Dealers to Sell Trucks

FOLLOWING the crackdown by the OPA on dealers for allegedly refusing to sell new passenger cars to persons holding rationing certificates, the WPB has now interpreted paragraph "e" of

If you ever run into snags when servicing the Olds Hydra-Matic transmission, you'll appreciate the procedure pictured on Pages 24-27. Beginning on Page 34, you'll find an article that answers many of the questions you have been asking lately about the production and service of synthetic tires.

Order M-100 to make it mandatory upon dealers with trucks in stock to honor ration certificates.

The new interpretation of the paragraph provides that "any manufacturer or sales agency to whom a certificate of transfer or government exemption permit is presented and who has in stock a new commercial vehicle of the type specified shall transfer such vehicle to the person named therein, irrespective of the terms of any contract of sale or any other commitment with any other person."

Unquestionably, there are instances where a dealer's immediate interests would be served by withholding a vehicle from the market, but the need for new trucks is great, and WPB orders have the force of law.

Addition to Oil Supply Weakens Pessimists' Case

WHILE it may be true, as the five world-girdling Senators reported on their return from the battle fronts, that this country is contributing far more than its share of oil to the Allied cause, the prophecy that American oil reserves will be exhausted in 15 years is not necessarily correct.

The NADA, in a recent statement, pointed to the fact that our proved reserves amount to 20,080,000,000 barrels, which compares with the 26,590,000,000 barrels used since oil was discovered in this country in 1859. Last year we consumed 1,390,000,000 barrels, a fact which indicates that our reserves at the present rate of consumption would not last beyond 15 years. However, these figures do not take into account the continual additions to our reserves.

During 1940, 1941 and 1942, extensions to known fields, revisions of previous estimates and discovery

(Continued on page 80)



Lt. Col. A. D. Smith making the presentation speech in the Surrey sales rooms. At top, Col. Smith pins an individual emblem on lapel of Samuel Dretzin, firm president.



View of the Surrey sales room and shop at

CAR DEALER

**Wins
Army-Navy**

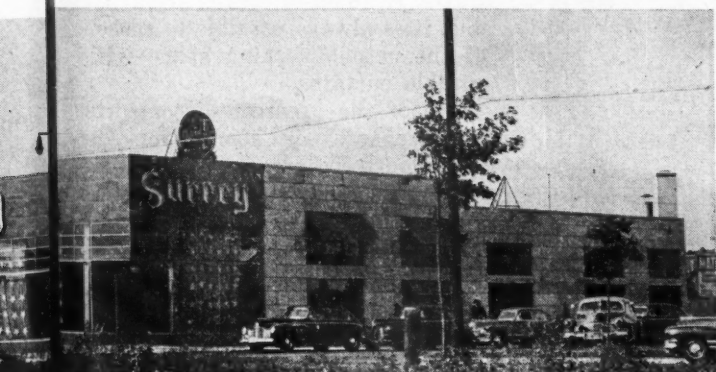


TWO years ago, many local WPB officials were telling harassed automobile dealers that it was useless for them to think about converting to war production. Their plants, so the WPB men said, were too small and their knowledge of highly technical and highly precise war work was too meager.

If any of these gloomy officials had been present at the ceremonies held recently in the sales room of the Surrey Motor Corp., in Long Island City, New York, their faces would have been red. Army and Navy spokesmen at that time conferred on the Surrey Engineering Corp., an affiliate of the dealership,



Discussing a problem of vital importance particularly to dealers, this article is only one of many in this issue of **MOTOR AGE** that make profitable reading for the car dealer and the men in his shop. All the articles in this and every other issue of **MOTOR AGE** offer helpful information on management, service, official regulations, and current developments pertaining to the automotive retail field.



Long Island City, N. Y., most of which was converted to war production.

the Army-Navy "E" for excellence in war production.

Of course, scores of automobile dealers have produced war material in the last two years, both as prime and sub-contractors. A dealer in Massachusetts won an "E" before the same honor came to Surrey. But, in several respects, the achievement of Surrey is unique.

In the first place, its contracts were won in the face of particularly discouraging conditions. Second, the war goods it makes had never before been produced by an American firm and even today are produced nowhere else in the country. Third, it arranged for the

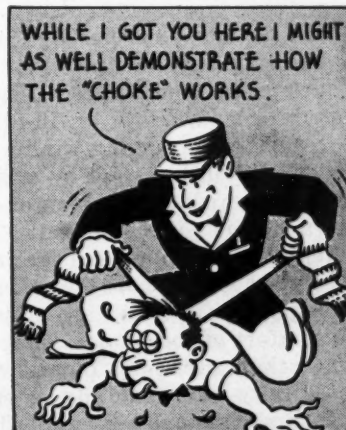
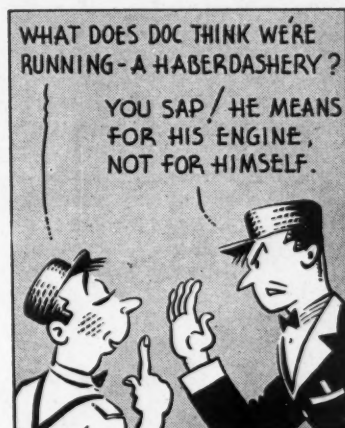
cooperation of 15 sub-contractors.

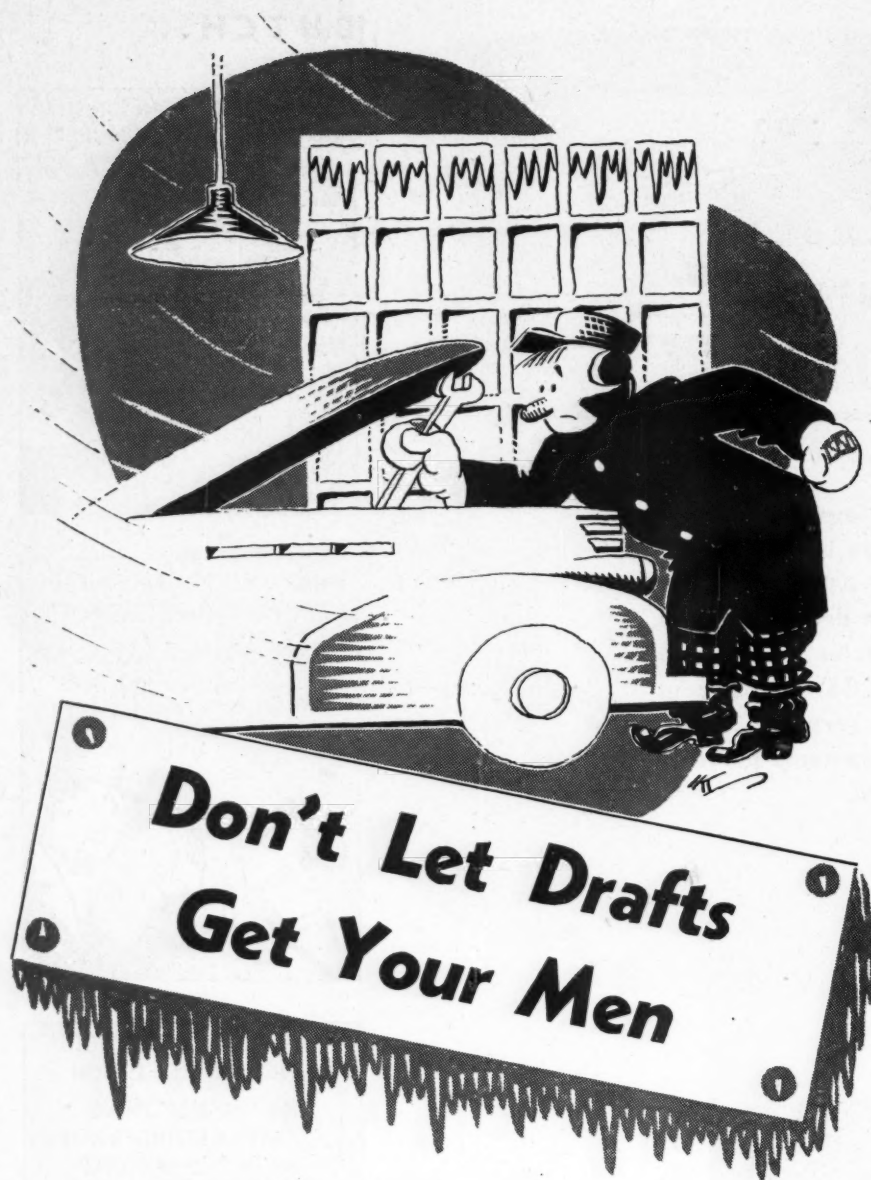
Breaking utterly new trails and ignoring obstacles, Surrey produced \$3,000,000 worth of goods in its first 12 months of war production, completed its first contract ahead of schedule, and meanwhile improved its production methods to such an extent that the firm voluntarily reduced the price on the second contract by 11 per cent.

Like all other dealers, the Surrey firm was stunned in January, 1942, when all passenger-car production was halted. In eight years of astute planning and vigorous merchandising, Surrey Motor had become

(Continued on page 84)

BUTCH..





A comfortable repair shop makes war jobs less alluring to your mechanics and reduces time lost through illness

THE Selective Service Act is not the only kind of draft that can get your mechanics. Neglect that broken window or ill-fitting door during the coming winter and your shop will be swept by a draft that may whisk a good man or two into a war job or a sick bed.

Regrettable though the fact may be, a good many shops in ordinary times paid little if any attention to the comfort of mechanics. They assumed that mechanics bulged with masculinity and that any attempt to hamper them by keeping them

clean and warm in wintertime might be resented. Things have changed. Mechanics can get as cold and wet as anybody and, now that jobs are plentiful, they are letting shop foreman know they don't like it any better than anybody else.

Making a shop comfortable and healthful for mechanics during the coming winter is not going to be easy, for coal strikes and oil shortages are going to make it impossible to get customary quantities of fuel. Nevertheless, almost any shop can keep its mechanics

healthier and more content by getting after some of the drafts and damp that ordinarily seem unimportant.

The first thing to do, naturally, is to look after the heating plant, to see that it is delivering the maximum amount of heat for the fuel burned. A heating contractor or your fuel dealer can give you some valuable tips on how to proceed.

Broken glass in both doors and windows should be replaced, and ill-fitting or damaged doors should be repaired. Cracks around windows or doors should be chinked. Automatic door openers should be put in first-class repair and, regardless of whether the doors are operated by power or manually, some one should be assigned the duty of keeping them closed except when in actual use.

- When a shop has been weather-proofed in this way, care should be taken to see that it still is adequately ventilated. It is as dangerous to run automobile engines in tightly sealed repair shops as it is in a private garage. Ventilation can be provided without creating drafts. If no other means are available, it is always possible to screen off the actual working space with suitable curtains.

One of the greatest discomforts for mechanics in some shops is damp floors. To prevent such dampness, drains should be checked and, if they are clogged up, they should be opened. Any trickles from the wash rack or tube-testing bay should be eliminated.

There are places in the shop where plenty of water is necessary, especially in winter. They are the wash rack and the wash room—and the water should be hot. In winter, it is necessary to get rid of the ice on cars before mechanics start work on them, and the best way to do it is to wash them down with plenty of hot water. In the mechanics' wash room, a good supply of bubbling-hot water does a lot to revive spirits at quitting time.

Some shop operators might call this interest in a mechanic's welfare "pampering." It may be. But the shop that gives the matter a little thought cannot escape the fact that a healthy mechanic is absent less than one with the chronic sniffles and that a contented mechanic thinks twice before grabbing one of the thousands of war jobs, in which as often as not working conditions are far from cozy.



Wartime SUPER SERVICE

Equipped and ready to do any automobile repair job, this shop can get more work from its men and handle a big volume of business

By HARRY L. SPOONER



Corner of shop where lubrication and wheel-alignment work is handled. Above, shop as seen by man driving up for complete service.

WHILE the usual order of development of a super-service station is to start with a gas and oil business and then keep adding other services, just the reverse has been true with the Auto Parts Service Station, Peoria, Ill., of which W. F. Grawey is proprietor.

Grawey opened for business in 1917 in a little shack, selling used parts from wrecked cars. His business expanded rapidly and two years later he started a wholesale

and retail parts business. Other departments were added from time to time. He also built a brick building for his parts business and, as other departments were added, he extended the building until today he has a very attractive business structure about a half block long with frontage on Adams street, the busiest street in the city.

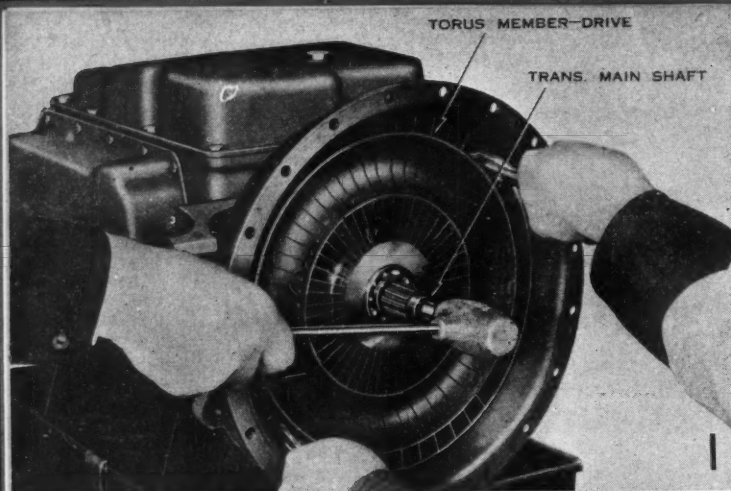
Among the several departments he added was a complete machine shop. This is equipped with grinder, a shaper, three lathes, hydraulic

press, connecting-rod rebabbiting equipment, boring machines, etc. This department does such work as rebabbiting of bearings, fitting of pistons, rings and pins, reboring of motors, grinding and replacing ring gears, planing and truing of cylinder heads, and many other services.

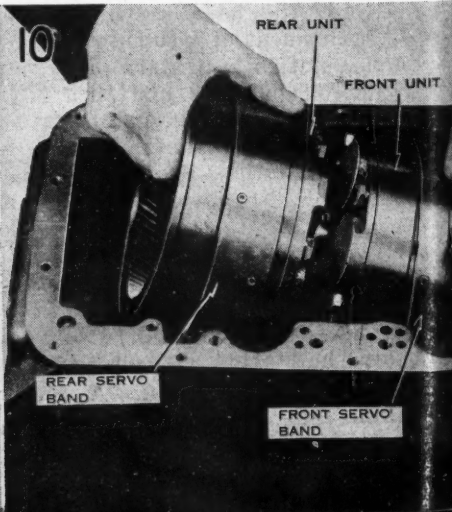
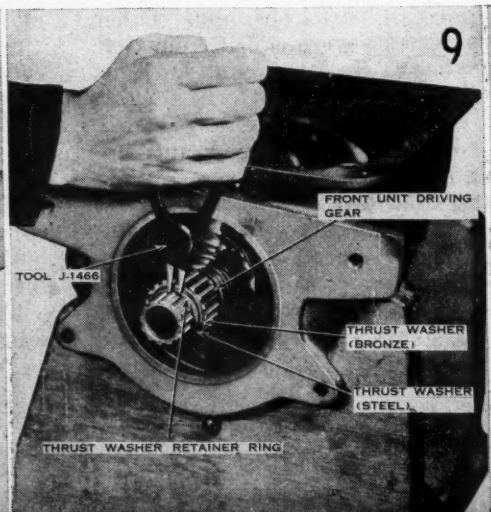
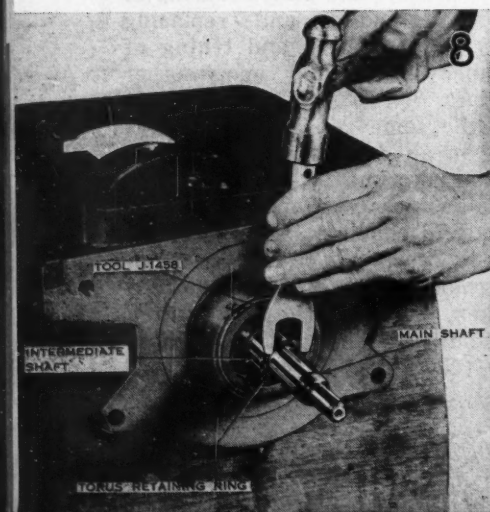
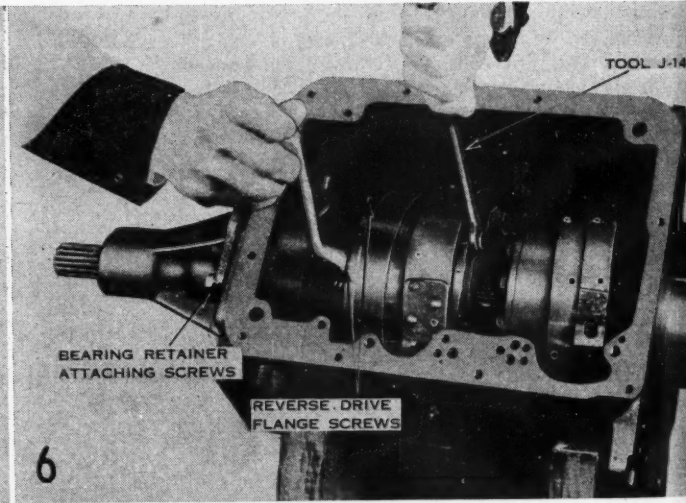
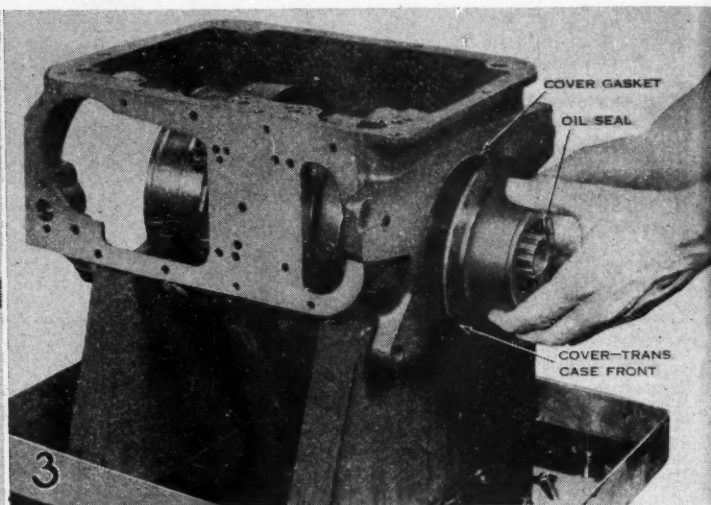
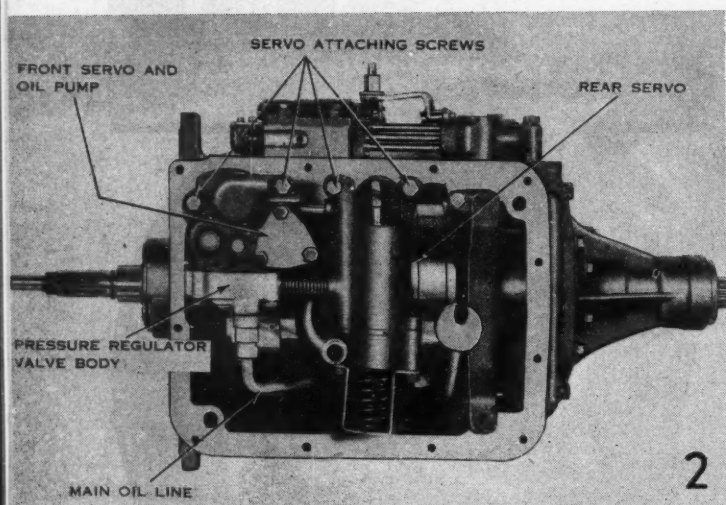
While some retail business was done in all departments, the business was primarily wholesale. A large business was built up in machine and repair work for dealers both in Peoria and in the surrounding country.

Then, in 1937, the gas station was built adjoining the machine

(Continued on page 50)

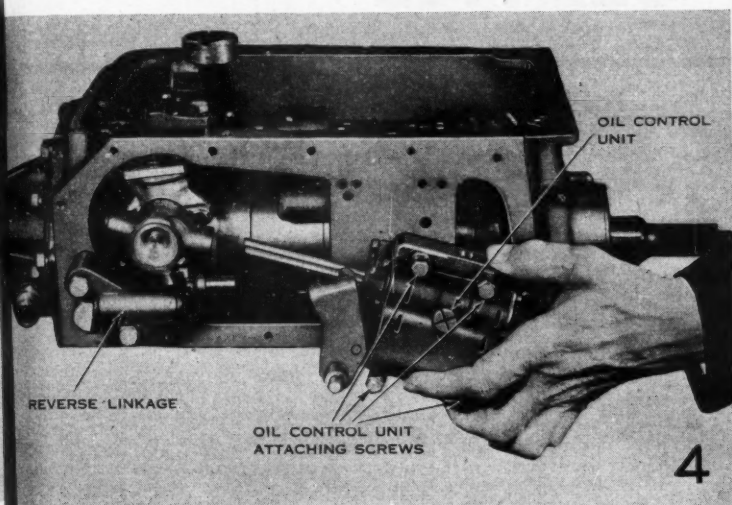


1. Place transmission in reverse, remove main-shaft nut and slide driven torus member off shaft. Hold vanes of driving torus member with pliers and tap lightly on main shaft, removing member. Do not bump it off with flywheel cover. Remove rear half of bell housing from transmission. Remove oil pan. Remove transmission side cover.



Hydra-Matic TRANSMISSION SERVICE

2. Remove main oil line. Remove all pressure-regulator-valve body. Remove two oil-delivery pipes from front cover and remove cover. Loosen rear servo adjusting screw (Fig. 26). Loosen four servo attaching screws and remove front and rear servo units as one.



3. Remove transmission-case front-cover assembly, being careful not to damage oil seal.

4. Loosen four oil-control-unit attaching screws, but do not remove screws from unit. Slide unit away from governor and toward front of transmission. Remove reverse linkage and pawl.

5. Remove rear oil-pump and governor assembly. Keep round governor weight toward front of transmission while removing, and do not force the unit out. It will slide out without binding if held in proper position.

6. Remove six reverse-drive-flange attaching screws. It is necessary to hold rear unit against turning while removing screws. Remove six bearing-retainer to transmission attaching screws.

7. Remove reverse-gear assembly from rear of transmission case. Leave selective thrust washer and clutch-hub thrust washer on transmission main shaft.

8. Remove torus retaining ring (horseshoe shaped) from front end of transmission main shaft, being careful not to spread ring. Pull main shaft out through rear of transmission.

9. Remove thrust-washer-retainer ring. Remove steel and bronze thrust washers. Remove front-unit drive gear.

10. Remove center-bearing attaching bolts between front and rear planetary units. Remove center bearing cap. Remove front and rear planetary units as an assembly, lifting up from the rear.

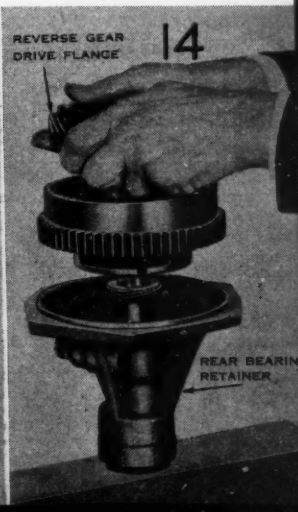
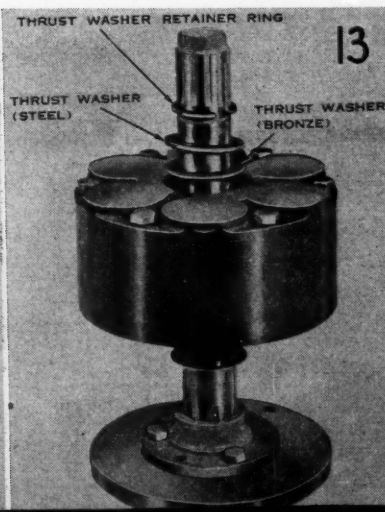
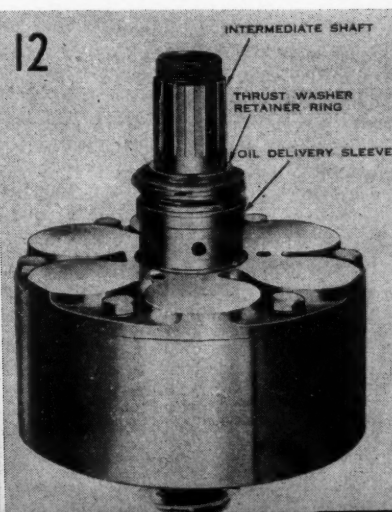
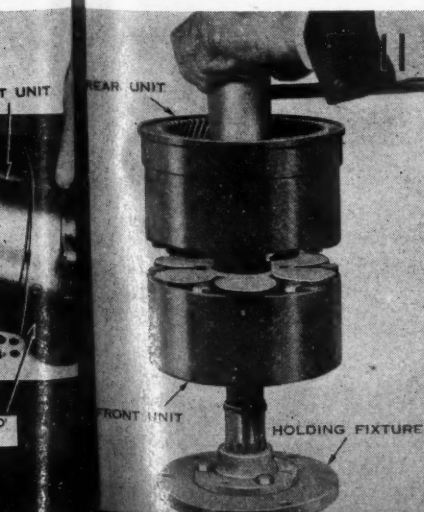
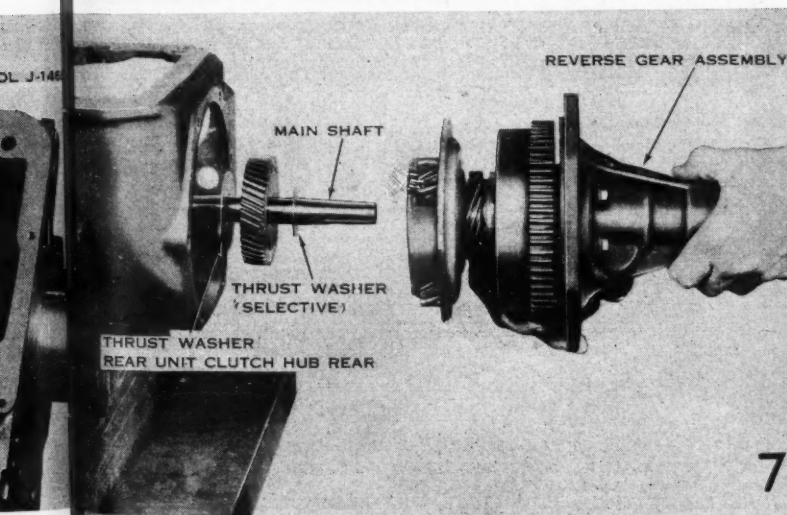
11. Remove nut from shaft in center of rear planetary unit and remove unit from shaft. **CAUTION:** There are 68 roller needle bearings in the hub which must be caught as the unit is slipped off the shaft. Hold them in place with rubber band as unit is removed.

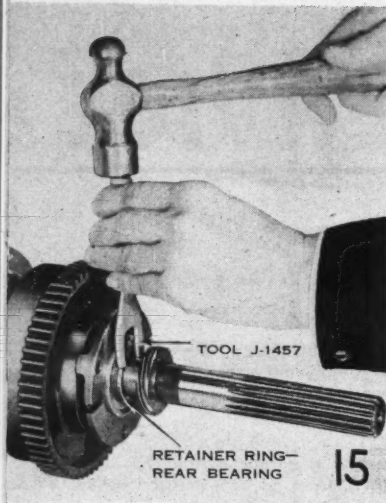
12. Remove roller-needle-bearing inner sleeve, roller-bearing washer and retainer ring. Remove oil-delivery sleeve.

13. Remove front-unit thrust retainer, steel and bronze thrust washers, and remove front unit from intermediate shaft.

14. To disassemble rear bearing-retainer and reverse-gear assembly, first remove screws holding rear-bearing-retainer to reverse-internal-gear support. Then hold reverse-gear drive flange and bump end of shaft on block of wood, driving rear bearing-retainer off shaft.

(Continued on Page 26)





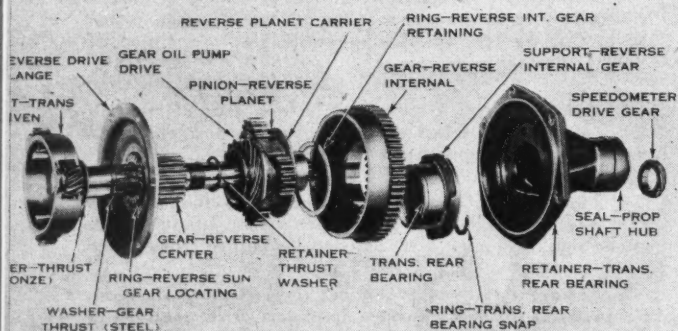
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OLDS

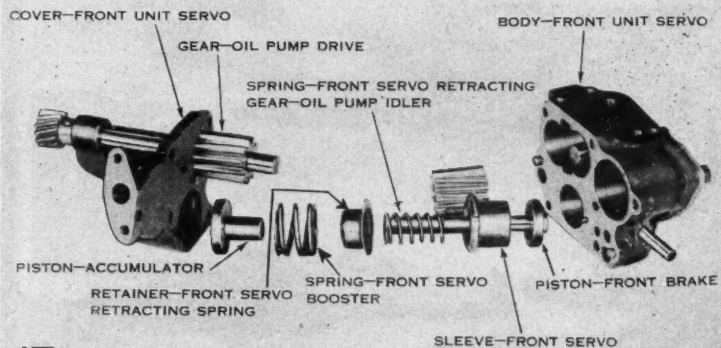
Hydra-Matic

TRANSMISSION

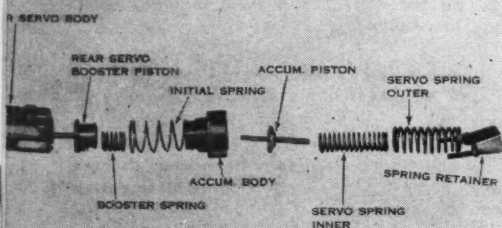
SERVICE



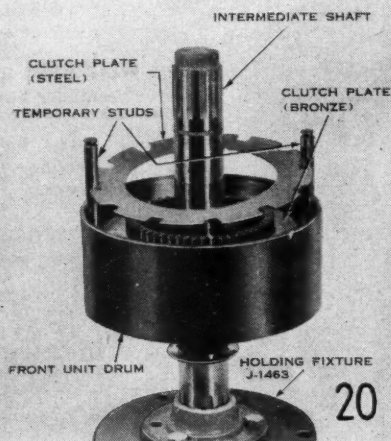
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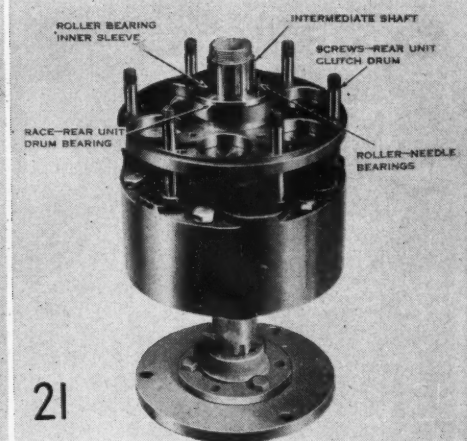
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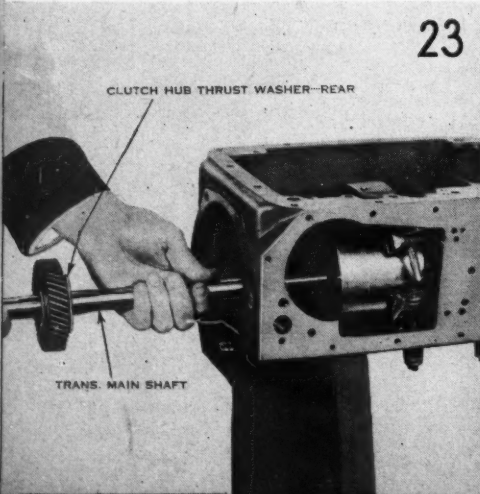
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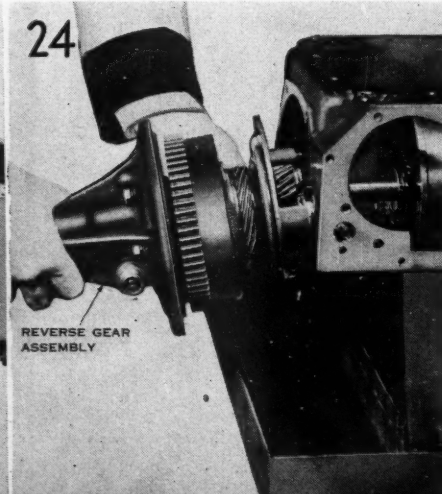
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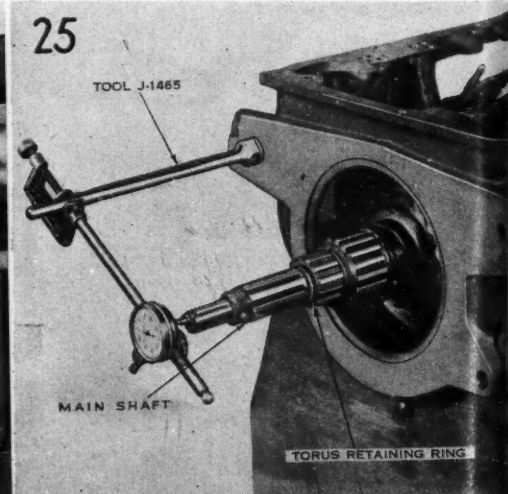
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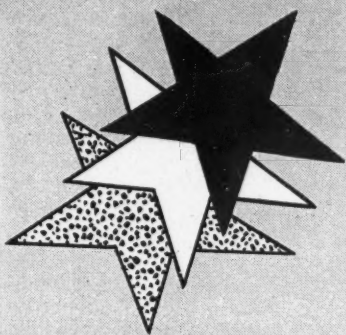
23



24



25



15. Remove rear-bearing-retainer ring. Place unit in press with shaft up, resting on plates placed under the outer edge of the reverse internal gear. Press the transmission shaft through the speedometer-drive gear and the rear bearing. Remove snap ring holding transmission rear bearing to reverse internal gear, and remove bearing. Remove reverse planet assembly, thrust-washer retainer ring and center gear, and reverse drive flange.

16. Assembly sequence of reverse gear assembly.

17. Assembly sequence of front servo unit.

18. To disassemble rear servo unit, place in a press before removing spring retainer screws; otherwise, unit will fly apart when screws are removed. Remove pump-cover to housing attaching screws, remove cover, pistons and oil pump gear.

19. Assembly sequence of rear servo unit.

20. To reassemble front planetary unit, place drum over clutch hub to rest on planet gears. Temporarily insert two studs as guides for clutch plates. Assemble bronze and steel plates into drum. (Start with bronze plate, then steel, then bronze, etc., ending with bronze plate.) There are four steel and five bronze. Place steel plates so that dish is toward center of transmission. Assemble six clutch release springs (short springs) into drum. Assemble clutch pressure plate in place over springs, being sure springs center in counter bores. Install clutch drum over aligning studs and tighten attaching screws. Install bronze thrust washer, steel washer and snap ring. Align lug of steel washer with flat portion of shaft. Install oil-delivery sleeve.

21. To reassemble rear planetary unit, install thrust washer retainer ring on shaft, and roller-bearing retainer washer over shaft next to retainer rings. Assemble cap screws with lock washers into clutch drum, holding in place with rubber band as drum is installed on shaft. Install roller-bearing inner sleeve over shaft. Assemble 68 roller needle bearings into place between inner sleeve and drum race. Install roller-bearing retainer washer.

22. Install bronze thrust washer into clutch hub. Install clutch hub. Install rear unit clutch hub lock over shaft. Be sure small lug is down, and in place in splines. Tighten lock nut, locking rear-unit clutch-hub washer, using center punch through hole in clutch hub. Install clutch pressure plate over attaching screws and assemble bronze and steel plates. Start with bronze, then steel, then bronze, etc., finishing with bronze. There are nine steel and ten bronze. Be sure dish of steel plates faces center of transmission. Assemble clutch release springs, and place brake drum over hub. Rotate drum back and forth until springs seat in counter bores.

23. Assemble brake bands over drums, double-wrap band over front drum and with short anchor over servo adjusting

screw. Assemble units into transmission case, and be sure single hole in oil-delivery sleeve is facing up and centered between holes in center journal. Assemble bearing cap, entering dowel pin in oil-delivery sleeve. Tighten cap bolts and turn up ends of lock. Install main shaft into intermediate shaft, being sure that oil seal ring enters the intermediate shaft freely. Be sure rear clutch hub thrust washer is in place. Install front-unit-drive gear, centering the oil-seal rings on the intermediate shaft and hold them in place with vaseline. Assemble bronze washer and steel washer in place over intermediate shaft against face of front-unit-drive gear.

24. Reassemble reverse gear assembly. Note: 9/16 in. clearance must be allowed between retainer ring and rear face of speedometer gear. Install new gasket on housing, and install reverse gear assembly into transmission case. Use sealing compound on attaching screws. Tighten reverse-gear drive flange to rear unit drum.

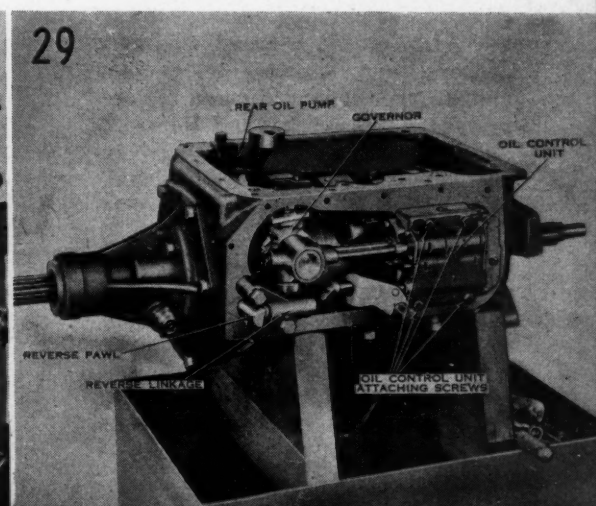
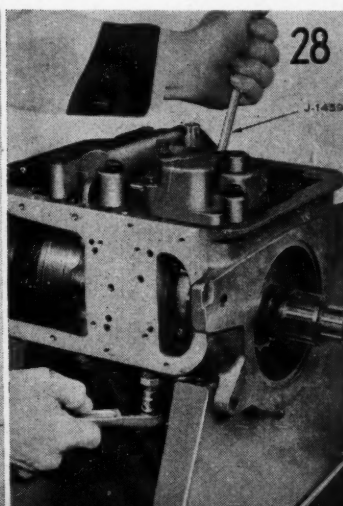
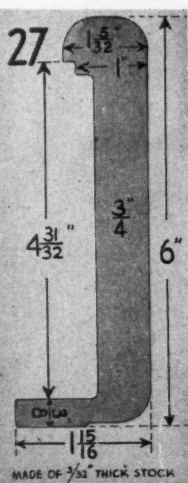
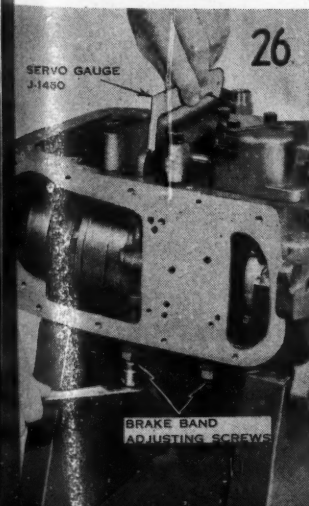
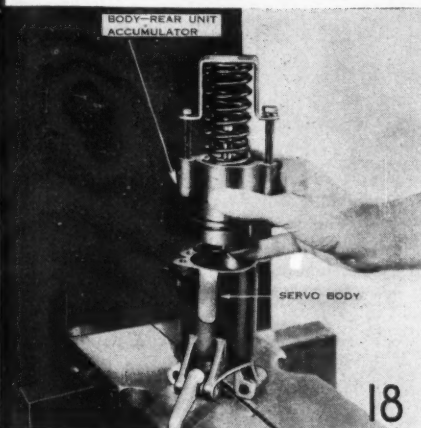
25. Check end clearance of main shaft with dial indicator placed against end of shaft. Insert screw driver between front drum and center bearing cap, forcing planetary units forward. Then move main shaft back and forth; end clearance should be .006 to .014 in. If incorrect, remove reverse gear assembly. Replace selective thrust washer on main shaft with one giving proper clearance. Install torus retainer ring to front end of main shaft. Install front and rear servo units. Be sure plunger on front servo enters brake-band anchor.

26. Adjust rear servo band, using gage illustrated in Fig. 27, placing over rear servo unit as shown. Loosen servo band adjusting screw lock nut. Adjust screw until end of servo plunger is flush with outer edge of gage, within 1/32 in.

27. Shown are dimensions of gage used for adjusting rear servo band.

28. Adjust front servo band, tightening adjusting screw until front drum cannot be turned in either direction. Mark position of adjusting screw, and then back off eight turns. Tighten lock nut.

29. Install front cover plate and oil-seal assembly. Install oil-delivery pipes into front cover. Install oil-pressure regulator valve body and spring assembly. Install rear oil pump and governor. Note: Keep round governor weight toward the front of the transmission while installing unit. Install oil-control body to side of transmission case, tightening screws evenly. Be sure oil pipes are in place between oil control body and governor. Install reverse pawl and reserve gear operating mechanism. Install oil screen. Install oil pan, being sure that copper washers are used under three screws on left side and under two screws on rear. Install side cover, using copper washers on seven lower screws. Be sure cork gasket is in place over shaft. Install manual shift outer lever.





★ ★ All Out For War ★ ★ ★

Seven stars in its service flag tell only a part of this repair shop's contribution to the war

If any family in America is making a greater contribution to the war effort than that of Herbert C. Rose, who operates the Rose Service Station at 3800 E. Alameda Ave., Denver, Colo., it is going to be hard pressed to prove its claim.

The Rose family before the war consisted of Mr. and Mrs. Rose, six sons and one daughter. Today all six sons are in the Army or Navy, the daughter's husband is in the service, Rose himself is doing war work and Mrs. Rose is running the service station.

Four of the sons are in the Army. James, 27, is a sergeant in the Air Forces; Richard, 30, is a corporal and a radio technician, and George, 21, and Robert, 19, are privates. Willard, 25, and John, 18, and the baby of the family, are in the Navy. The daughter's husband, George B. Snell, entered the service recently.

Even Buck, the family St. Bernard, is doing his bit. With a keg bank tied to his collar, he solicits funds for the Red Cross on Denver streets.



George B. Rose



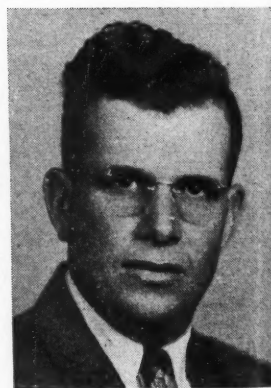
Willard R. Rose



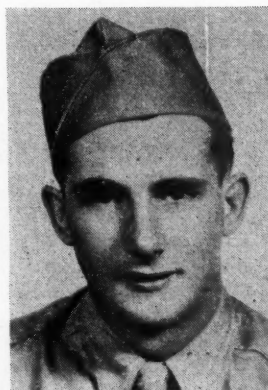
George B. Snell



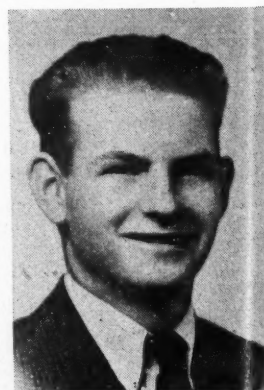
James J. Rose



Richard H. Rose

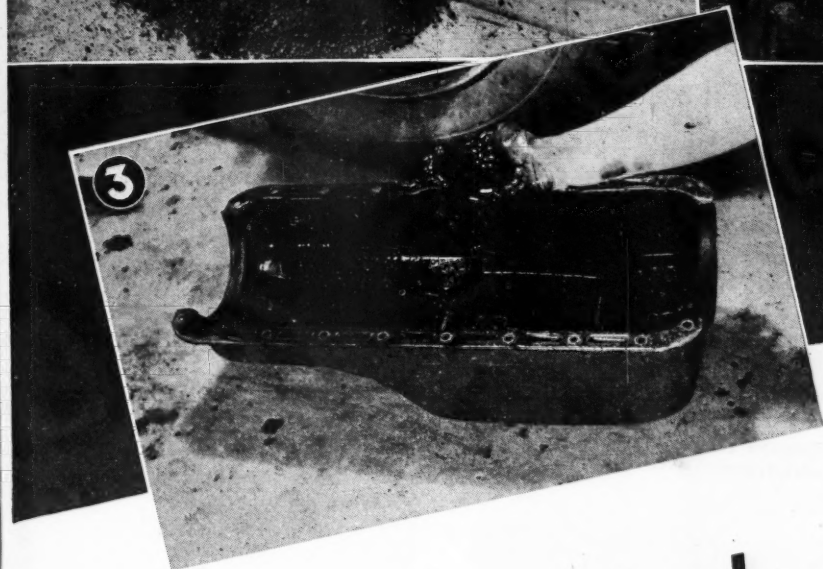
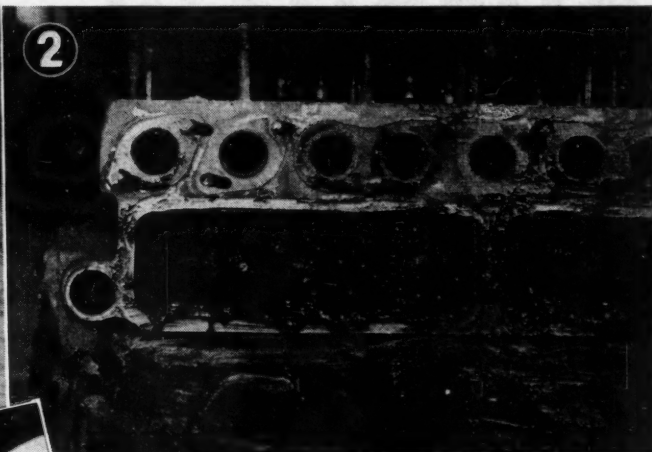


Robert J. Rose



John L. Rose

Herbert C. Rose, right, and his wife, left, in their Denver, Colo., shop. Rose also works in a war plant. Buck, the St. Bernard at left, helps the Red Cross.



1. Heap of metallic particles removed from an engine oiling system by means of a modern filter. 2 and 3. Accumulations of sludge in a valve chamber and in an oil pan.

Why Engines Need OIL FILTERS

Under wartime driving conditions of low mileage and low speed, diluents allowed to remain in crankcase lead to rapid formation of sludge and harmful acids

TOO many car owners are changing engine oil on a pre-war basis, which under present-day conditions, is definitely not good enough.

Before it became necessary to ration gasoline and tires, car owners on the open road were driving 50 and 60 m.p.h. and, what is of greater importance and interest, nearly every motorist would fre-

quently drive 20 to 25 miles without stopping the engine. In other words, engines were often driven at full operating temperatures for periods ranging up to an hour or more.

Today, with 75 per cent of the car owners limited to an "A" ration book giving them only 2 or 3 gal. of fuel per week, trips have become shorter, with the result that en-

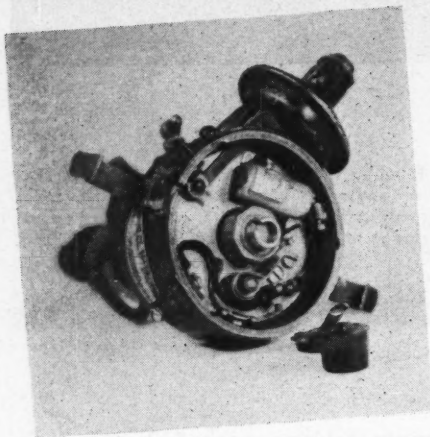
gines seldom reach full operating temperature; or, if they do, the time is of such duration that the moisture condensed in the crankcase and the fuel which passes the rings is not evaporated. This reduction of engine operating temperature is the important difference between wartime and pre-war operating conditions. For, if the diluents are permitted to remain in the crankcase, acids and sludge are quickly formed.

Sludge and acid increase the wear of engine parts and reduce economy of operation. Rings and oil lines quickly become clogged with sludge, with the result that cylinders and bearings are not properly lubricated, and excessive wear results. The acid tends to attack such parts as crankshaft journals, wrist pin and engine bearings. These surfaces become pitted as the result of the acid and it soon becomes necessary to replace the part.

Sulphur is frequently one of the ingredients found in a crankcase as the result of blow-by and G. H. Cloud and A. J. Blackwood, of the Standard Oil Development Co., reported at a recent meeting of the Society of Automotive Engineers the results of some experiments which indicated that increasing the sulphur content from .2 to 1.0 per cent may result in a 40 to 80 per cent increase in engine fouling

(Continued on page 58)

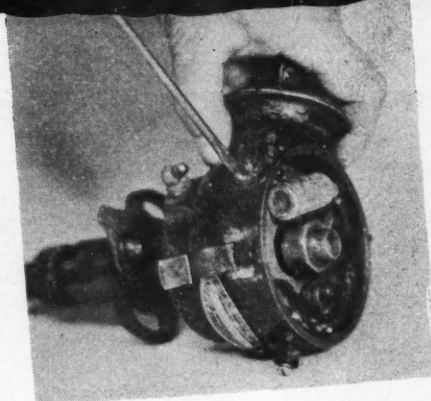
OVERHAUL DISTRIBUTOR for **BETTER**



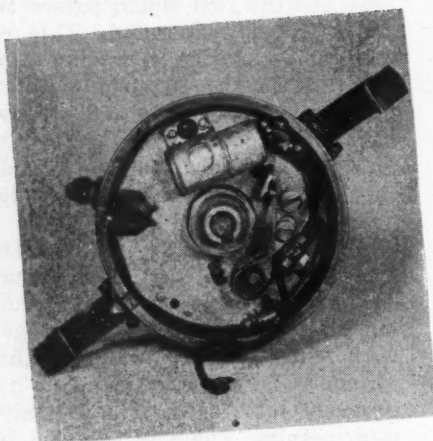
1. Remove rotor from distributor shaft.



2. Remove screw and washer holding vacuum-advance arm to the breaker plate.



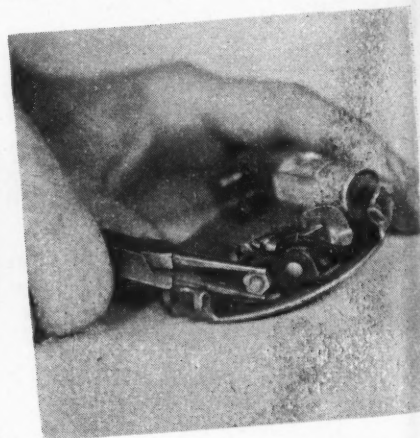
3. Take out the two screws holding the vacuum-advance unit to the distributor housing.



7. Turn the breaker plate until the three balls line up with the slots in the housing.



8. Lift the breaker plate assembly out of the distributor housing, being careful not to lose the three balls on which the plate rides.



9. Loosen the unit holding breaker arm spring in place.

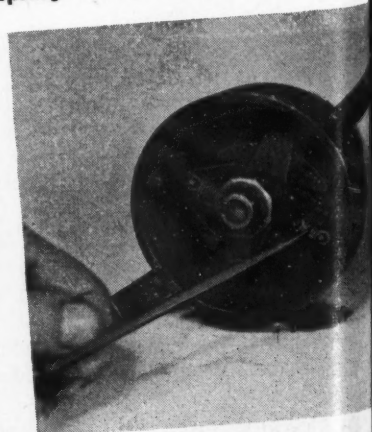
13. Take out the screw holding the condenser to the breaker plate.



14. Remove the condenser from the breaker plate.



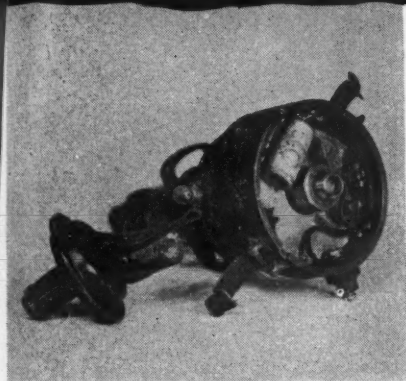
15. Take the two governor weights springs off their posts.



R R TUNE-UP

Detailed in these pictures is the right procedure for doing a faster job on unit used on 1938-42 Buicks

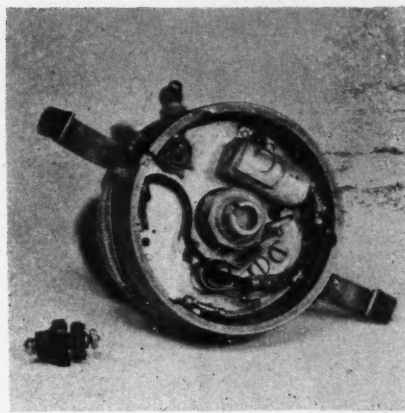
By BOB TURNER



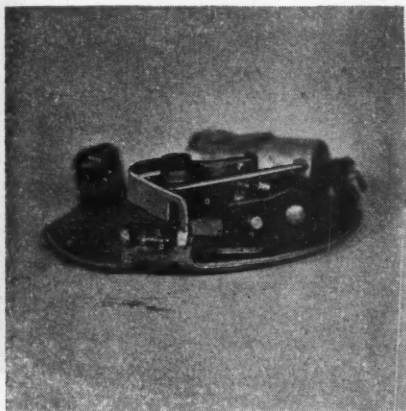
4. Lift the vacuum-advance arm off the pivot on the breaker plate and remove the unit from the distributor housing.



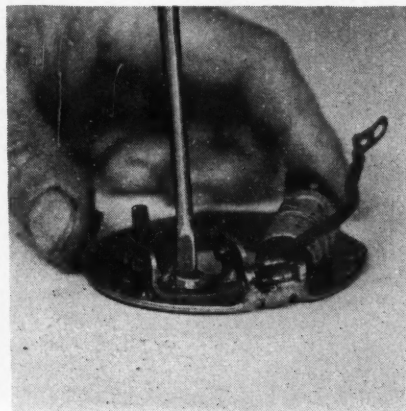
5. Remove the nut holding the breaker point connecting wire to the terminal.



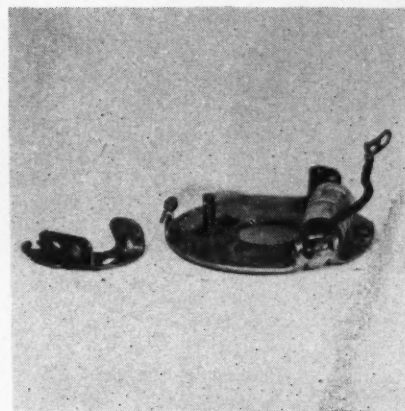
6. Remove the terminal from the distributor housing.



10. Raise the breaker arm and spring on its pivot and remove from the breaker plate.



11. Remove the stationary point lock screw.

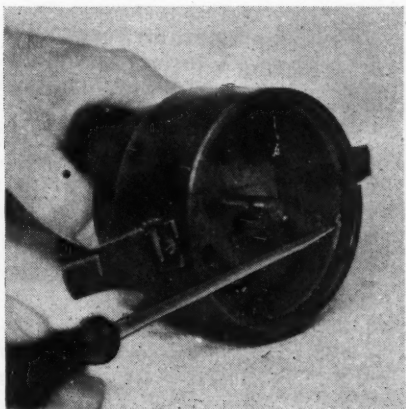


12. Lift the stationary point off the breaker plate.

16. Lift the cam and governor weights out of the distributor housing.

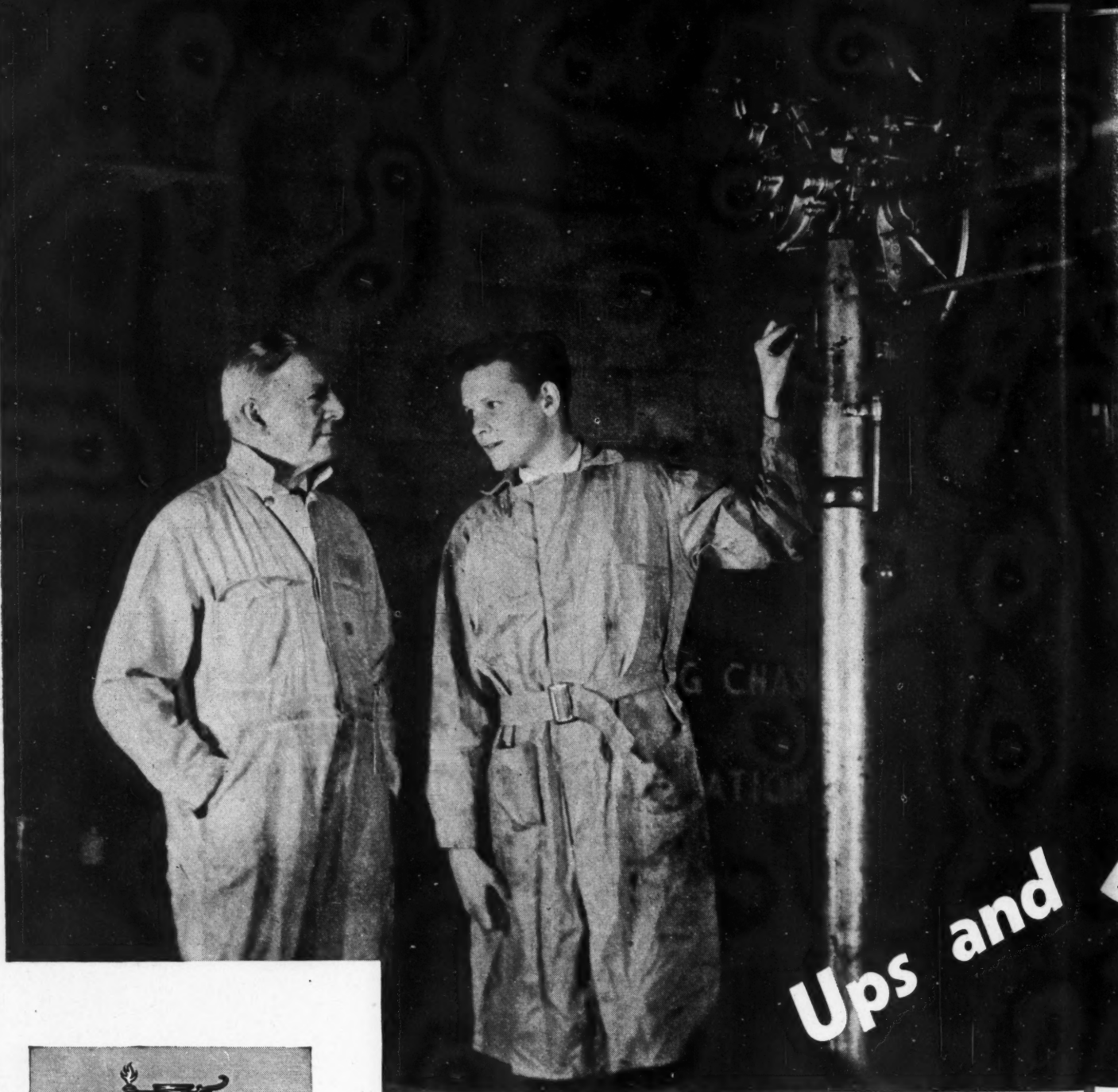


17. Thoroughly clean and polish the race in which the breaker plate balls ride. Use very fine sandpaper to polish the groove.



Clean all parts thoroughly in a suitable cleaning solution. Replace any parts that are defective or worn. Test the condenser and set the points to .015 in. when reassembling the distributor. Place a few drops of light oil on the felt under the rotor to lubricate the cam bearing.





Ups and



AS Pop O'Neill passed the lubrication lift, Tommy Winters, the new apprentice, was lowering the car he had just lubricated.

"Got anything else for me?" said Tommy.

"I guess Larry won't have no trouble diggin' up somethin' for

"Got anything else for me?" said Tommy. "Yes," said Pop, "it's time you found out what's

you. Learnin' anything, are you?"

"I'm getting a pretty good idea what's under a car," laughed Tommy.

"That's important—but it's time you was findin' out what's under the hood. Suppose you back that car off the lift and come with me. We'll go over a coupla points about engines we didn't get the last time we talked."

When Tommy had parked the newly lubricated car on the lot, Pop went over to a bay where a four-year-old six was being torn down for a ring job. He took up a piston-

and-rod assembly from the bench. "Know what this is, don't you?"

"Why that's a piston and a connecting rod," said Tommy.

"Call it a rod-and-piston assembly," said Pop. "It sounds more professional. You gotta get acquainted with pistons as fast as you can. There's more work bein' done on pistons and cylinders nowadays than there ever was. We ain't produced no new cars for a coupla years and most of the cars on the road is gettin' ripe for cylinder reconditionin'. Back in the days when a lotta people turned in



Downs

of PISTONS

and RINGS

That's taper and most guys say the skirt has collapsed. The cylinder takes a taper, too, but just the reverse of the piston. It gets wider at the top than at the bottom. The result is the loose piston slaps against the cylinder wall as it moves up and down, and you have a noisy engine. A loose piston wears faster than one that fits. And, what's more, you have an oil pumper."

Pop saw a frown wrinkle Tommy's brow.

"That ain't a very enlightenin' term," said Pop. "What happens is, on the suction stroke there's a partial vacuum above the piston. This sucks in mixture from the intake manifold but, if the piston ain't tight, it also sucks up oil from the cylinder wall below the piston. The oil that gets up into the combustion chamber is burned and wasted."

"But wouldn't the piston rings help some?" said Tommy, running a finger up the side of the piston which Pop held. "They look like they're a lot wider than the piston."

"You mean their diameter is greater? Yes, it is, but that's only because the piston is outa the cylinder. You gotta compress 'em to get 'em into the cylinder and then

they're almost flush with the lands—that's these ridges between the grooves the rings fit into. The purpose of the rings is to act as a sort of packin' to prevent the compressed gases from leaking past the pistons and also to keep excess oil from working past the pistons into the combustion chamber.

"As a matter of fact, the latest type rings go a long way toward overcomin' piston and cylinder wear. Take expander-type pistons that has a kind of spring around the inside of the ring. Some manufacturers say their piston rings will overcome taper from .005 to .025 inch. Others don't claim no more than .010 can be corrected with new rings.

"But there's other ways of overcomin' piston and cylinder wear in the early stages. Before the war, when we could get tin, some shops used to tin-plate the pistons to bring them up to the proper diameter. Then there's ways of expandin' both aluminum and iron pistons to offset the wear. But there comes a time when the cylinders and pistons is worn so much that the best rings in the world won't stop oil pumpin' or compression leaks."

(Continued on page 54)

under the hood of a car."

In the 25th article of a series, Pop O'Neill clears up some questions for his young apprentice on the function and service of these important parts

By J. EDWARD FORD

a car every two years, most of 'em never bought a ring job in their lives. Now they have to.

"But, as Archie would say at Duffy's, that's all aside from the point. We started to talk about pistons themselves. This piston here is aluminum, like a lot of pre-war pistons. But, regardless of whether a piston is aluminum or cast iron, it's bound to wear, and it'll wear the cylinder wall, too.

"Somewhere around 40,000 or 50,000 miles, the skirt of the piston—that's the bottom here—is apt to be less in diameter than the top.

Salient Facts About Synthetic Tires



The fact that this is a synthetic-rubber tire is indicated by the marking on side-wall. S-3 means it is composed of a styrene-type synthetic.

A 10.00/24 synthetic rubber tire, with 30 per cent crude and rayon cord, probably will have 50 to 60 per cent of the mileage of a pre-war tire.

Prime requisites for getting normal life out of synthetic tires are: No overloading. Speed limited to 35 m.p.h. Prompt and proper repairs.

Intensive research is under way. Constant improvement may be expected.

In making vulcanized and cold-patch tube repairs, instructions should be carefully followed. The hot-plate curing schedules are as follows:

For passenger car tubes: 25 min. at 287 deg. F. or 40 lb. pressure; or 15 min. at 307 deg. F. or 60 lb. pressure.

For truck tubes: For each 1/32 in. of thickness of repair material—7 min. at 287 deg. F. or 40 lb. pressure; or 5 min. at 307 deg. F. or 60 lb. pressure.

Low Down on **SYNTHETIC**

IT is the consensus of engineers and research men in the major rubber companies that all-synthetic passenger car tires are almost as good as pre-war natural-rubber tires under the present war-time operating conditions, especially the 35-mph. speed limit. But commercial vehicle tires of synthetic are definitely inferior to those of natural rubber due to their heat-generating tendencies. Synthetic-rubber truck tires will not stand over-loading and excessive speed. It is generally conceded that they will give 50 to 60 per cent of the wear of pre-war all-rubber tires under reduced operating speeds and no overload, but all the important factors of tire conservation, including proper alignment and inflation, must be observed if such tire life is to be obtained.

Synthetic rubber inherently generates more heat through energy than natural rubber. As the size of the tire is increased, more heat is developed, with a consequent breakdown in the composition of the tire carcass. Four and six-ply passenger-car tires are thinner and

Engineers find it gives satisfactory service in passenger-car tires, but truck tires still require some crude and inner tubes demand special care

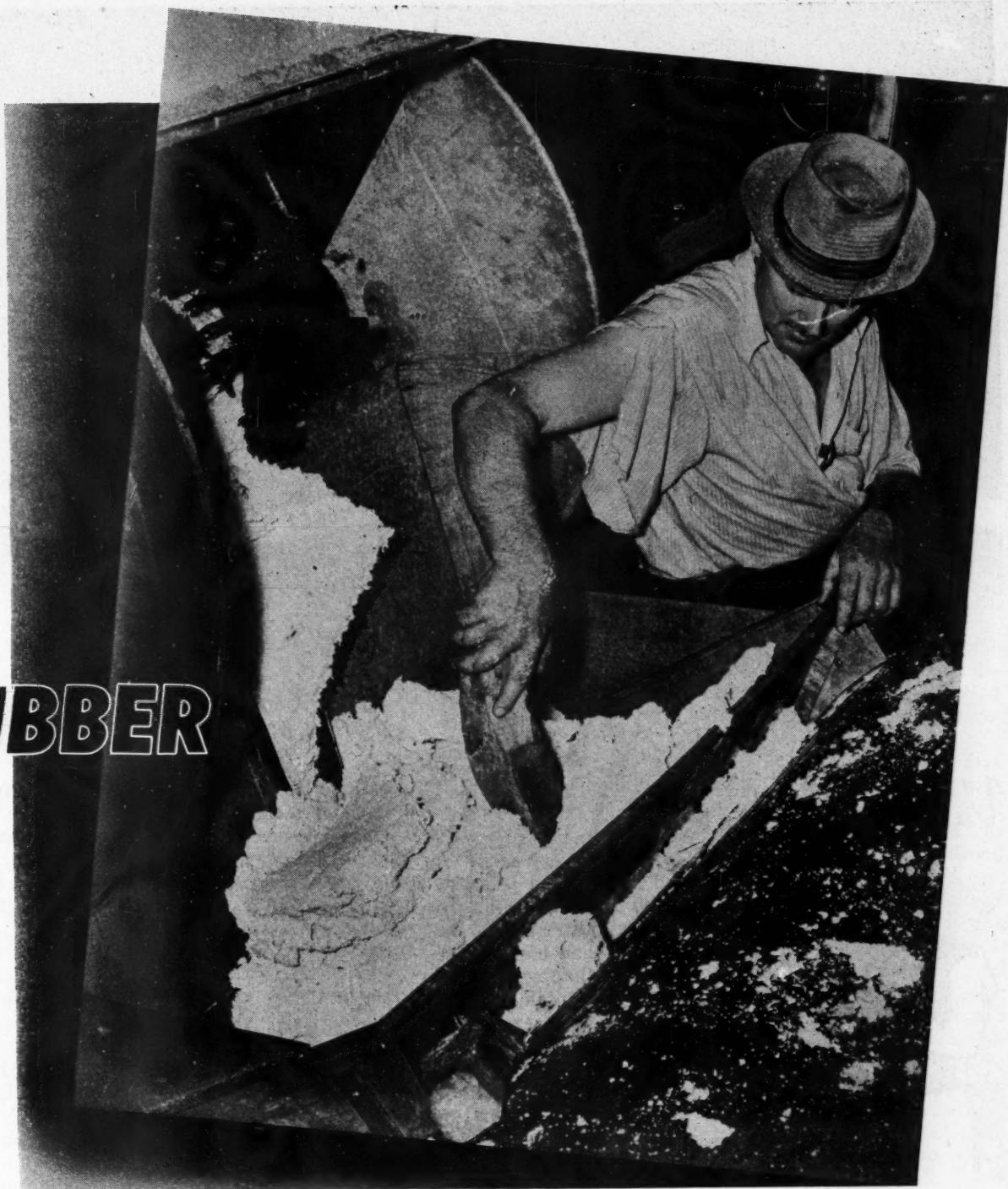
BY ED WARNER

not subject to overload, so they do not generate as much heat. But commercial-vehicle tires of 10 plies and upward will develop more heat, which is increased by excessive speed or any overloading of the individual tires. Use of rayon instead of cotton cord in synthetic truck tires will help minimize the heat factor but it will not overcome it.

Tires made of GR-S (government

rubber styrene type) also are less resilient than natural rubber, transmitting any road impacts to the cord. This makes them more susceptible to bruising. When hot, they are less resistant to cutting, chipping and cracking than natural rubber, so the bad effect of the heat-generating factor can be seen. Other ingredients must be discovered for synthetic-rubber tires if they are to have greater elas-

RUBBER



Synthetic rubber, made from petroleum, comes from filter. This is a step in making both Buna-S and Buna-N.

ticity and resiliency without sacrificing endurance. Chemical research by the rubber companies is the chief hope of improving this situation. That this hope is justified is borne out by the fact that, on the basis of analysis of captured equipment and comparison with U. S. tires, this country has made more progress in the development of synthetic rubber tires in two years than has Germany over a

period six or seven years longer.

Each synthetic-rubber tire will be designated with a rectangular or circular mark on both sides of the tire. An S (for GRS) followed by a number will be superimposed on the rectangle or circle and the color of the background will indicate the type of synthetic rubber used. Red will indicate GR-S, yellow will show GR-M, or Neoprene, bright blue will identify it as GR-I, or

butyl rubber. The number following the letter will indicate the comparative amounts of natural and synthetic rubber in the tire. So far, S-3, S-4, S-5, S-6 and S-7 tires have been or are scheduled to be produced. Tubes of synthetic rubber also will be marked with a code letter and a stripe of red, yellow, or bright blue to correspond to the material, at the base of tube.

(Continued on page 60)

DID YOU Know It?

WHO?

WHAT?

WHEN?

WHERE?

WHY?

... and HOW!

Vulcanizer



Almost every modern science and technique is indebted in a less or greater degree to some chance observation or happy accident. The automobile business is no exception. Several developments that have contributed most to the comfort and safety of modern automobiles are the result, direct or indirect, of chance.

Rubber tires, the value of which is being fully realized for the first time, were made practicable through the accidental discovery of vulcanization more than 100 years ago.

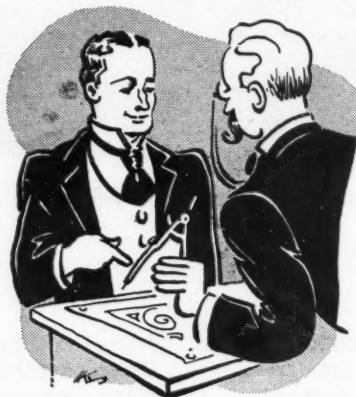
Charles Goodyear, whose singular contribution to the tire industry is attested by his statue in Akron, Ohio, the tire-making center of the world, is the man to whom the fortunate mishap occurred.

For ten years, Goodyear had sought a means of making rubber useful. It had previously been little more than a natural curiosity, a tree sap that could be stretched or bounced. Practically it had little value, because it lost its shape when heated and wore rapidly.

After his own years of experimentation had failed to produce an answer to the riddle, Goodyear bought the rights to a process involving the use of sulphur, and set about the task of perfecting it. But perfection eluded him until one day in 1839 when he was

working with his rubber-and-sulphur compound in the kitchen of his home at Woburn, Mass. Accidentally he dropped some of the mixture on the kitchen stove. When Goodyear removed it, the rubber had lost its plasticity. Heat, instead of destroying the qualities desired in rubber, had actually supplied them, as the result of an accident.

Invasion Plans



"America's Proposed Invasion of Europe." This headline on an article in a copy of a 1906 automobile magazine that fell into our hands the other day was something of a shock. Of course, eager reading of the article soon disclosed that no military venture impended in 1906. The invasion was to be automotive, and the

reason behind it is hardly credible today.

The proposal to send 50 American-built passenger automobiles to Europe was to show Europeans that this country not only could build automobiles but did build them. The idea was promoted by Georges Dupuy, American correspondent of *L'Auto*, of Paris. He had been in the country only about a year but in that time had seen European cars take prize after prize in speed

LET US SEND YOU \$10.00

Motor Age will pay \$10.00 each for acceptable short items or articles which are published in this department. They should be brief, preferably with a real humorous touch and, above all, should be of wide interest to those in the trade. They can be anecdotes regarding well-known men in the automotive industry, interesting bits about little known facts relating to the industry or its products, stories about unusual stunts or experiences with automobiles from the earliest day to the present. The general character of the material desired may be judged best by referring to the items on these pages and in this department in previous issues. The facts should be simply but plainly stated without any attempt, necessarily, to put them in publishable form. The Editors will see to that.

Send your contribution—every reader of Motor Age is invited to do so—to "Did You Know It", Motor Age, Chestnut and 56th Sts., Philadelphia 39, Pa.

trials, races and in long-distance endurance contests.

In 1906, for example, a French Darracq had covered the mile at Ormond Beach in 28 1/5 second, and the Vanderbilt Cup race also had been taken by a Darracq. The first American car finished eighth. Dupuy's promotion was directed to the pride of American manufacturers.

The quantity and quality of American automotive production needs no press agent today. With the possible exception of one nation, all Europe recently welcomed the sudden descent of thousands of American motor vehicles on the continent.

Plastics Veteran



Much ado is being made over the prospective use of plastics in the post-war automobile but, as a matter of fact, plastics in an automobile working part were tried 33 years ago by Charles F. Kettering, the indefatigable vice-president in charge of research for General Motors.

Back in 1910 "Boss Ket," then a budding young researcher in Dayton, substituted bakelite for hard rubber in a distributor head. Prior to that the old curved-dash Oldsmobile was equipped with side

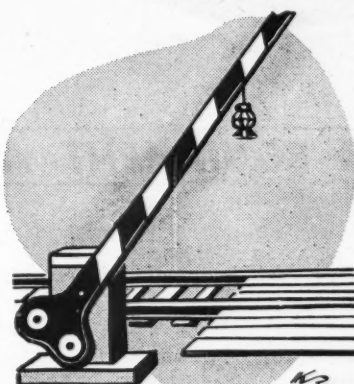
curtains of Celluloid, which, of course, is plastic, but curtains were not a working part.

During World War I, Kettering was experimenting with other types of plastic distributor heads. He developed one made of an asphaltic composition.

Despite a great deal of comment, especially in the Sunday supplements, on plastic post-war motor cars, Kettering is very conservative in his views on this subject.

"A lot of people show us nice pictures of plastic automobiles," says Kettering. "I don't know whether you want a plastic automobile or not. We will have to make a few of them and let you try them, because the customer is the boss when it comes to the industry."—*Ed Warner.*

Kid Stuff



Did you know that back in 1905-06, long before the Safety First idea was born, a small group of school children, somewhat precociously, decided to take action to curtail night motoring accidents?

At a New Jersey coast resort, it was observed by summer residents that at night at railroad crossings the cross-

ing gates were difficult to see when lowered. This was because they were parallel to and blended with the steel tracks in the acetylene headlights' glare. Sometimes motorists failed to see these barriers and crashed right through. Following a bad accident near Long Branch, several school children got together and wrote a letter to the automobile editor of a weekly in their home city. They suggested that the gates be painted with alternate rectangles of black and white, in order to improve visibility—possibly an adult's idea. They declared they had made the experiment on a rail fence and that it was a success. The editor published the substance of the letter.

Then out of pure curiosity—to ascertain how the idea would be received by railroad men—he wrote to the heads of two large railroads, enclosing clippings of the item and calling attention to the fact that the procedure would be a desirable and practical means of eliminating grade-crossing accidents. One of those executives did not reply, but the other wrote a courteous note, explaining that the idea, while possibly meritorious, would be far too expensive for a railroad to undertake!

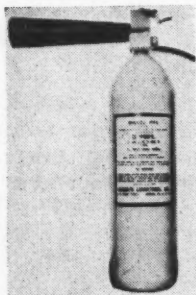
The editor, somewhat ruffled, then published a paragraph scolding the railroad president for shortsightedness, and a New York newspaper ran an editorial advocating the "extravagant" painting plan.

But, expensive or not, the children's idea caught on. Within 18 months, several railroads adopted black-and-white rectangles for crossing gates, and before long the practice became universal.—*Worth Colwell.*



PARTS TOOLS EQUIPMENT ACCESSORIES

Gas Fire Extinguisher



"Model FF-4," the latest in Randolph's 4-lb. CO-2 series of fire extinguishers, features a self-aimed, fixed discharge horn, and a thumb-operated trigger valve that releases a penetrating blanket of carbon dioxide, a

gas that smothers fires in an instant. This new designing exclusive with Randolph Laboratories, is said to make Model FF-4 one of the fastest-firing extinguishers manufactured.

Additional information on carbon-dioxide fire-fighting methods may be obtained from the manufacturer, Randolph Laboratories, 8 E. Kinzie St., Chicago, Ill., on written request.

Skin Protector

A new skin protector has just been announced by the Commercial Solvents Corp., of 17 East 42nd St., New York 17, N. Y. The new product, called CSC Protector, is non-sticky, white, and greaseless. It will not irritate sensitive skin, and it has no drying effect even after long, continuous use. Women mechanics find it

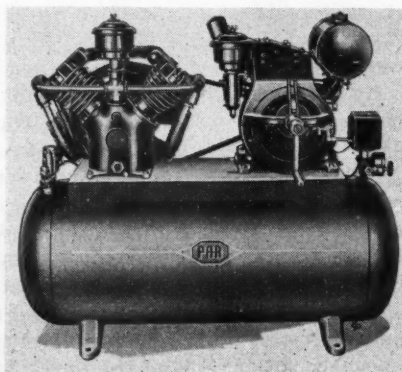
helpful, since it eliminates permanent griming and grease-staining of hands and nails. CSC Protector-coated hands leave no stains or smudges on tools, papers, or metals.

CSC Protector is rubbed into hands and nails thoroughly before work is begun. It guards the hands for four to five hours after application. When work has been completed, the user cleans his hands as usual. CSC Protector washes away, taking dirt and grime with it.

Available in 8-oz. jars and in the economy-sized 1 gal. jar.

Army Air Compressor

This four-cylinder gasoline-engine-drive air compressor is being built for the Quartermaster Corps, Motor



Transport Division, of our armed forces by the Lynch Manufacturing Corp., of Defiance, Ohio. This is one of the six models built in quantity for the armed forces, and is called Model G-15-QC.

Bin-Card Holders

Stock-room bin-card holders made of ivory plastic, available in a variety of shapes and sizes for immediate shipment, are the latest addition to the line of the Plastic Division of Hollywood Athletic Co., 211 E. 7th



St., Los Angeles 14, Cal. Stock widths of $\frac{5}{8}$ in., $\frac{7}{8}$ in., $1 \frac{7}{16}$ in., may be had in any of the stock lengths of 3 in., 4 in., or 5 in.

The material is practically soil-proof but is washable in addition. Complete descriptonal folder, together with prices, will be sent upon inquiry to Plastic Division of Hollywood Athletic Co., at the above address.

Brake-Cylinder Cleaner

This brake-cylinder cleaner and polisher meets a demand for a satisfactory method of cleaning or polishing the inside of a brake cylinder. The film of rust and muck is thoroughly cleaned in a few seconds. Also, by applying an abrasive to the blades of the cleaner and polisher, the cylinder can be honed to a mirror finish in a very short time.

The tool can be adjusted to service brake cylinders from 1 to $1 \frac{1}{2}$ in. inclusive. This wide range of adjustment permits the servicing of about 80 per cent of the brake cylinders manufactured.

It is designed to permit the operator the choice of either polishing the brake cylinder or cleaning it. Manufactured by the Hyland Manufacturing Co., 818 John St., Portsmouth, Ohio.

Laughs OF THE MONTH



"I just live for the day mechanics are plentiful again!"



"I win my bet with John—he thought the tires would wear out first!"



"It may be true of the repair industry in general—but they're certainly not short-handed in this shop!"



"We were out of fanbelts, Mr. Sweeney, but we made a substitute for you."

WASHINGTON RULINGS AND REGULATIONS



Inventory Limit Lifted For Parts Producers

INVENTORY restrictions on the production of automotive replacement parts have been removed by the WPB in an amendment to Limitation Order L-158. For nearly eight months, manufacturers had not been permitted to maintain an inventory in excess of that maintained on April 1, 1943. The intent was to get the production into trade channels as rapidly as possible. Since quota restrictions had earlier been removed, manufacturers are now free to produce replacement parts on the list of functional parts in as great quantities as their material allocation permits and whenever they choose.

However, the WPB henceforth will have authority to direct any producer or distributor to deliver or sell replacement parts to any person and in such quantities as the board may determine.

A further provision of the amendment directs distributors to return used ignition contact points to the producer or supplier for reclamation. The move was made to conserve tungsten.

Several additions have been made to the list of functional parts which may be manufactured. These include front fenders, which house or hold headlights, spot, fog and back-up

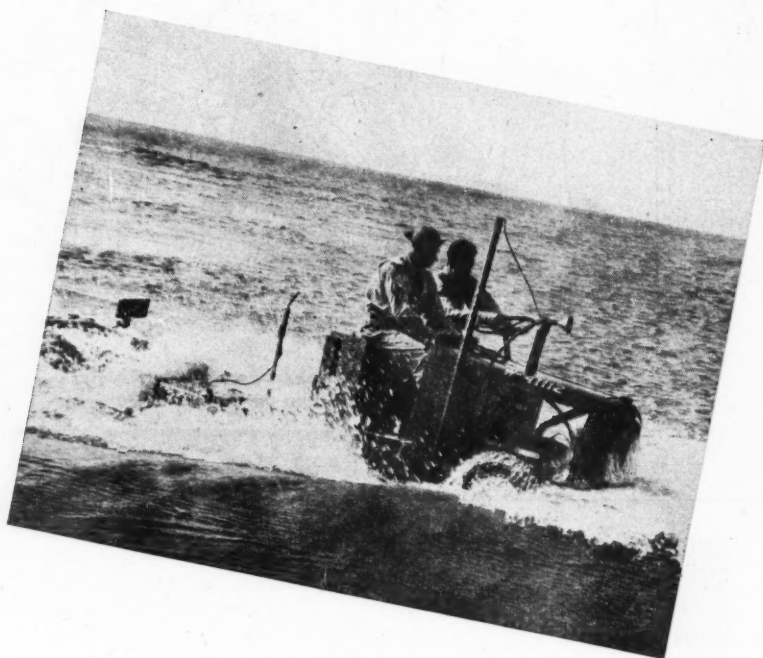
lamps, reflex reflectors, and truck and bus traction sanders except for passenger cars and light trucks. "Engines, less starting, ignition, and fuel systems" has been substituted for "Engines (component parts only)."

Additional exceptions have been made to the list of parts that may be purchased by a consumer without the necessity of turning in an old part. These include oil filters for all

vehicles, and auxiliary springs, trailer connections, brakes, fifth wheels, auxiliary fuel tanks, governors, landing gears, heavy-duty generators, auxiliary transmissions, power take-offs, heavy-duty trailer axles, wheels and rims which do not increase tire sizes, marker, clearance and identification lamps, externally controlled spot lamps, fog lamps and back-up lamps, signaling devices, reflex reflec-



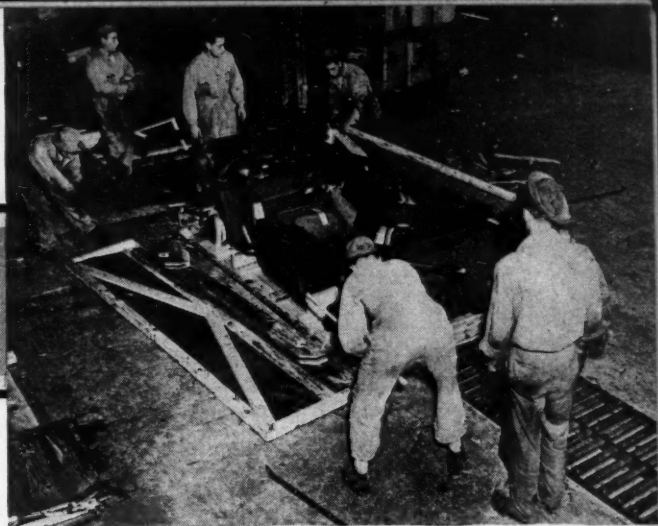
PORTABLE PIPELINE. Designed to carry oil to battle fronts, the pipeline being laid here by Army engineers is pliable and merely bends unless struck directly by bomb.



WADING JUGGERNAUT. Streams and ponds hold no terrors for this odd truck if its wheels can touch bottom. It was built by an Amphibious Training Command unit.



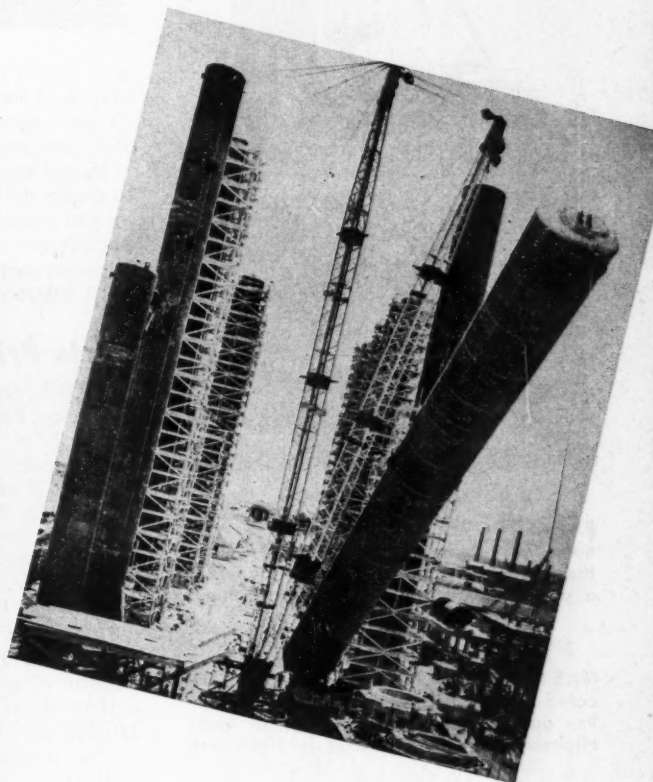
RACING MAJOR. Major William H. Arnold, engineering chief of big U. S. Army air base in England. As Billy Arnold, he won the 500-mile Indianapolis race in 1930.



THREE-MINUTE JEEPS. That's the speed at which the Army's all-purpose vehicle is put together in England on the assembly line erected there by Ordnance Dept. men.



TANK WAGON. But it's somewhat different from the usual kind. Built to carry tanks to repair depots, it can handle units as big as the 30-ton Gen. Sherman medium.



SYNTHETIC GIANT. This plant at Port Neches, Tex., largest of its kind in the world, will produce butadiene, chief ingredient of synthetic rubber, from petroleum.

tors, windshield defrosters, truck and bus traction sanders for all vehicles except passenger cars and light trucks.

Production Ban Lifted On Some Shop Equipment

An amendment to order L-270, covering automotive shop equipment, tightens production limits on

some items and relaxes the limits on others.

It is now permissible to manufacture in any calendar quarter 20 per cent as many of the following items as were sold in the corresponding 1941 quarter:

Fast battery chargers, distributor-setting machines, and twin-post lifts of not less than 10 tons capacity. Manufacture of these items was for-

bidden in the original order. Pit or lift jacks of not less than five tons capacity now may be made in quantities up to 75 per cent of the 1941 quarter total. These also were among the forbidden items on the original order.

Spark-plug cleaners, originally limited to 20 per cent of the 1941 production, may no longer be built when of

(Continued on page 42)

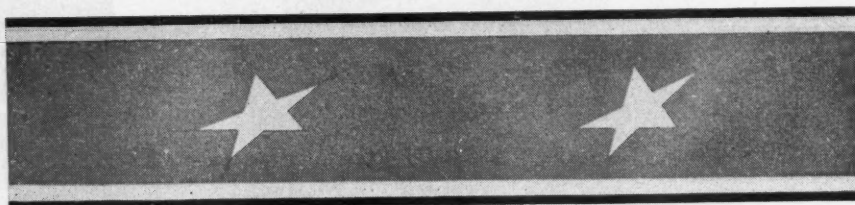
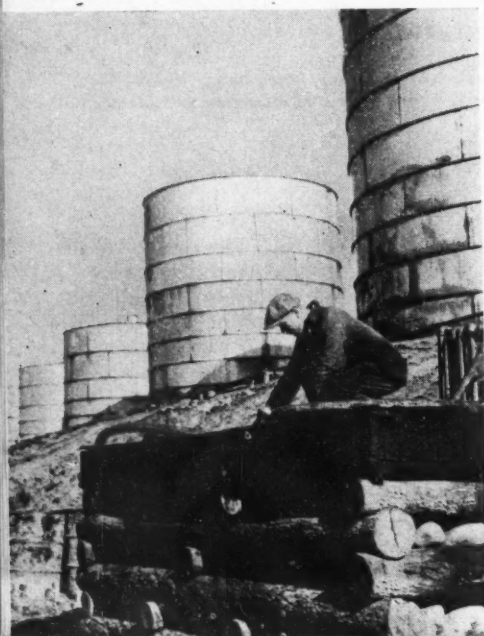


AIR BUS. Model of a 14-passenger helicopter which was used to persuade air authorities by Greyhound Bus Lines when they applied for a post-war air-bus license.

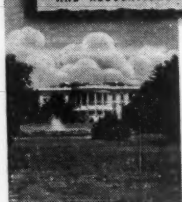


PARASCOOTER. That might be a good name for this folding motor scooter, which the British army drops with paratroopers in a parachute container. It makes 45 m.p.h.

GAS OUTPOST. These storage tanks, located at Fort Norman, Canada, feed gasoline and oil to the trucks using the Alcan Highway, as well as planes in Northwest.



WASHINGTON RULINGS AND REGULATIONS



the pedestal or stand type.

The limit on cylinder leakage testers, formerly set at 75 per cent, has been reduced to 20 per cent.

Prong-type battery testers, horses or trestles,

and bench-type spark-plug cleaners, may now be made in quantities up to 75 per cent instead of being limited to 20 per cent as in the original order.

Manufacturers are now forbidden to make delivery of any item covered by the order except on A-5 or higher preference ratings. No priority ratings are required of repair shops for shop equipment.

Parts Pricing Revised

AMONG changes made in Maximum Price Regulation 452 by Amendment 2, is the provision that parts manufacturers may now accept payment at a proposed new price instead of waiting 30 days or until the new price has been approved by the OPA. If the proposed price is rejected, the manufacturer makes a refund on the basis of the OPA's decision as to price.

One effect of the change will be to enable manufacturers to resume production of parts for obsolete cars and deliver them at once, without first obtaining an O. K. on price.

The amendment also changes the definition of manufacturer. Anyone buying parts and reselling them under his own parts number and for which he lists resale prices in catalogs and price lists is now considered a manufacturer.

Where a manufacturer does not ordinarily quote a price in a catalog or price list, he may now notify the purchaser of the maximum resale price by noting it on the invoice. He is no longer required to place a notice of maximum prices on each invoice.

Anti-Freeze Quota Set

AQUOTA of 60,000,000 gal. has been set by the WPB for anti-freeze manufacturers. This quantity, the WPB declares, will be adequate for all cars, trucks, buses, farm tractors, and stationary engines in the

country during the coming winter.

Of the quantity to be produced, 46,000,000 gal. will be ethyl alcohol, and 8,000,000 ethylene glycol. The remainder will be isopropyl alcohol, wood-distilled methyl alcohol, and some grades of synthetic methyl.

Manufacturers, under previous orders, are distributing the anti-freeze under a WPB plan that takes care of colder states first, and the Southern states last.

1944 New-Truck Quota Increased to 123,492

TRUCK production for 1944 has been placed on the same priority basis as the production of aircraft and high-octane gasoline, it has been announced by R. L. Vaniman, director of the Automotive Division of the WPB, who at the same time released the information that the 1944 goal has been boosted from an original 33,852 units of all classes of commercial vehicles to 123,492.

Vehicles will be produced under a single schedule which, Vaniman said, will include the requirements not only the ODT, Lend-Lease, the Office of Economic Warfare, the Maritime Commission, and certain Canadian agencies, but also the procurement programs of the Army and Navy.

Trucks to be built under the new program will include 92,057 vehicles of 9000 to 15,999 lb. gross weight, 21,030 ranging from 16,000 to 24,000 lb., and 10,405 vehicles of 24,001 lb. and more gross weight.

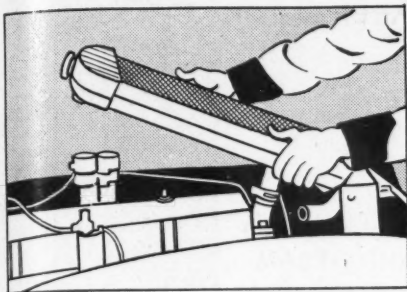
All requirements as to component parts have been pooled, and their manufacture scheduled from raw materials to completed product. In some cases, new or expanded facilities will be provided to handle the program.

Jack Models Fewer

IN standardizing jack models and sizes, the WPB in order L-322 has reduced the number of models from 403 to 225 and the number of sizes from 1825 to 864. Only a few of these, of course, are used in the automotive field.

Wheel-type shop jacks, hydraulic or mechanical, may be manufactured only in 1½, 4, and 10-ton capacities, and only one model and size is permitted in each category. Only one

(Continued on page 79)



Removing 1942 Radiator Core

On 1942 Chevrolet, the following procedure should be observed:

Drain cooling system, remove the radiator, drain cock and rubber hose to prevent damage when lifting out core. Open hood and block in wide-open position.

Disconnect upper and lower radiator hoses at radiator. Also loosen upper hose clamp and cylinder-head outlet connection and turn hose around so end will be free of radiator. Loosen lower hose at water pump so the hose and metal elbow can be turned around to clear the radiator.

Disconnect wiring harness from clips—one on each side of the radiator support and three across rear face of core top tank. Pull wiring harness back toward engine until it is out of the way.

Remove the four bolts holding the core band to the support, two on each side, top and bottom. Remove air cleaner from carburetor.

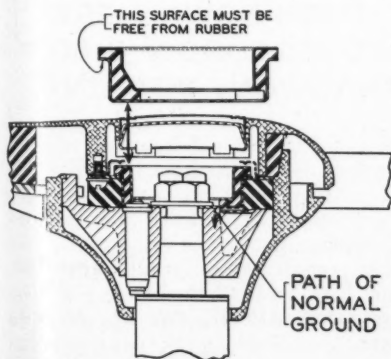
Move the fan blade so the wide spacing between blades is at the sides, to prevent interference at the core-outlet connection when removing the core.

Grasp the core at the top tank and lift straight up until the outlet connection contacts the support cross brace. Then lay the core straight back horizontally to thread the outlet connection past the cross brace.

Horn Shock

A few cases have been found where the driver receives a shock when blowing the horn of the de Luxe Pontiac steering wheel. This is caused by a poor ground contact.

The path of the normal ground is



SERVICE HINTS



FROM THE FACTORIES

shown in the illustration. If the underside of the lower cup in the horn contact assembly is not clean, the natural ground will be insulated, causing the ground circuit to be shunted through the horn ring to the driver's hand. To correct this condition, thoroughly clean the underside of the lower cup.

Eliminating Window Rattle

To eliminate window rattle at the window-guide studs on Studebakers, a steel tension washer is now used at each door. The washer is placed adjacent to the head of each guide stud, with the convex side against the leather washers which operate within the guide. Rattle is prevented by the tension which the new washer places against the leather washer. Two washers per door are required. To install them it is necessary first to remove the door glass and lift the channel assembly.

Painting Plated Parts

When servicing plated parts of passenger cars and trucks in which a painted part must be installed on a vehicle having chromium plating, it will be necessary to paint over some of the original plating in order to match the painted part being used for replacement.

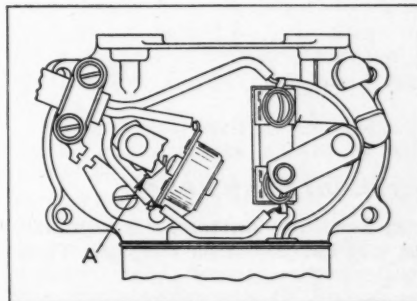
The best method of applying paint over chromium plating is to rough up the surface of the chromium with an emery cloth and then bake on a prime coat before applying the finish color coat of paint. If equipment for baking is not available, great care must be exercised in roughing the surface of the chromium before applying an air-drying prime coat.

It is preferable, however, to bake

the prime coat wherever possible, as this will result in greater durability of the paint over the plating.

Electric Wiper Repair

The electric windshield wiper units on 1941 Studebaker Commander and President cars are so designed that, after the switch is turned off, the motor will continue to run until the wiper arm and blade reach the bottom of their stroke and the arms are parked in that position. Should the motor continue to run after the switch has been turned off, it requires only a minor adjustment which can be made without removing the wiper motor from the car.



Before making any adjustment, make sure the motor has been operated at least 10 or 15 minutes so that the points are warmed up. Then stop the wiper with the arms and blade at the top of their sweep. Do this by either turning off the ignition switch or opening the line between the battery and wiper-control switch.

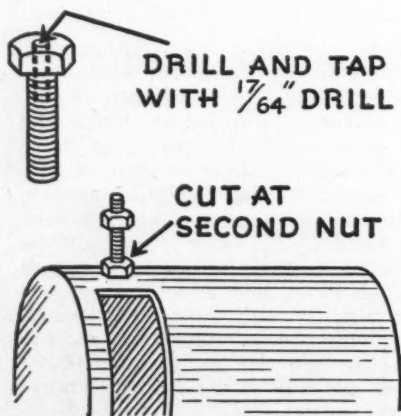
Insert a screw driver under cam "A," as illustrated, and bend cam out very slightly, only a few thousandths of an inch. Be careful not to bend the cam out too far or it may strike either the side of the switch plunger or the switch case.

\$5 SHOP KINKS

Here's your chance to pick up a little cigaret money. We'll pay five bucks (\$5.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and faster than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Incidentally we won't accept any that have previously appeared in any other automotive publication. Here are some that were accepted this month.

Terminal Post Repair

On Ford V-8 starters, the terminal bolt and nut are often stripped. This

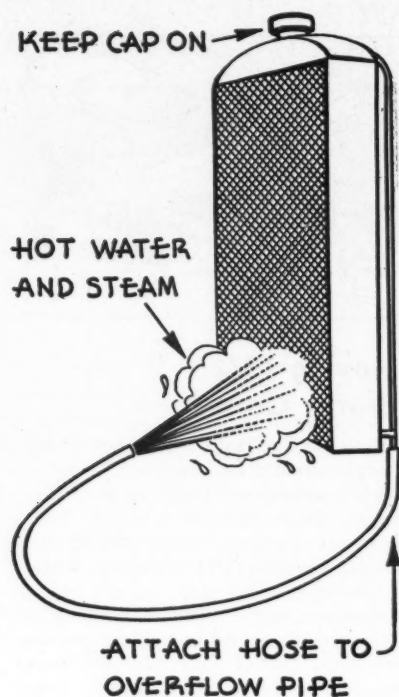


requires installing a new post which is quite a lot of work.

We make the following repair which works very satisfactorily: Cut the old post off above the second nut. Then remove the nut. Take a $\frac{1}{8}$ x 1 in. cap screw and drill the head with a $\frac{17}{64}$ in. drill. Tap the hole to fit the old post. Install on the old post with the head down. This cap screw forms a new terminal post.—Joseph S. Cote, 537 Moody St., Lowell, Mass.

Thawing Radiator

To thaw out a frozen radiator, we attach a hose to the overflow pipe of the radiator and run the engine with the radiator cap on the filler neck. When the engine gets hot, water and



steam will be forced out the hose on the overflow pipe which can be sprayed over the front of the radiator core.—Scharder Sales, 1700 N. Telegraph Rd., Detroit, Mich.

Bearing Salvage

We have been experiencing a great deal of trouble in getting new Chevrolet throwout bearings, so we have devised the following repair which works very well:



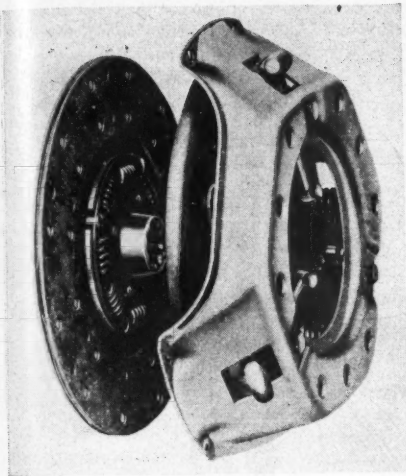
We brake the old bearing off the throwout collar, then set the collar up in a lathe. We then turn the collar to a press fit for a Ford "60" throwout bearing.

This repair works on all Chevrolets from 1938 to 1942, inclusive.—Victor Rasmussen, 510 W. 6th St., Morris, Minn.

THE READERS'

CLEARING HOUSE

of Servicemen's Queries



Chattering Clutch

I am having trouble with the clutch on a 1939 Ford, which chatters in reverse but is O.K. in forward action. I have installed a new clutch plate but that didn't help any. The flywheel and pressure plate seem to be smooth and O.K. and all bearings check O.K. What do you think could be causing the trouble?—Theodore Schierlmann, Liberty, Kan.

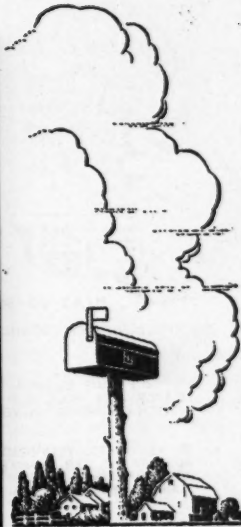
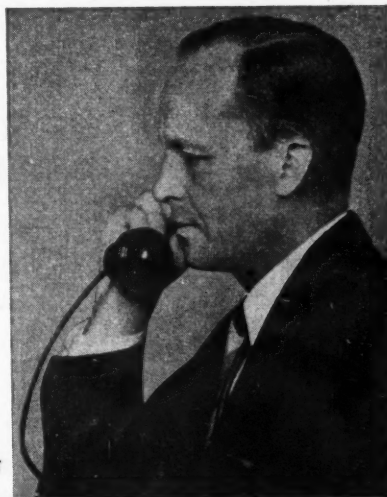
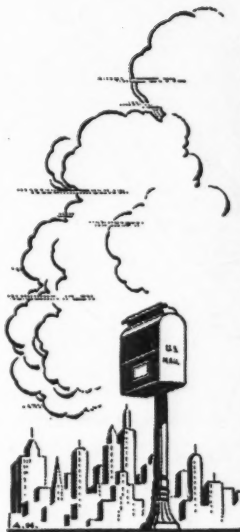
If you are absolutely sure that the clutch plate, flywheel and pressure plate on that Ford are in good condition, the chatter may be caused by loose engine radius or torque rods, which extend back from the engine to a cross-member. This difficulty might also be caused by worn universal joints, loose spring "U" bolts and worn shackles. Also make sure that the rods extending from the outer ends of the rear axle to the torque tube are tight.

I would also check the front wishbone and front spring "U" bolts.

Hard Starter

I have a customer who has a 1937 Dictator Studebaker which runs all right, but, when he stops the engine, it will not start again until we take the air cleaner off and pour gas in the top of the carburetor.—A North Carolina Subscriber.

FIRST of all, check the float level in the carburetor, or, more properly, the fuel level, with the top of the carburetor off and with the engine running. The fuel should be $\frac{5}{8}$ in. below the top of the float bowl while the engine is running. Also check the fuel line between carburetor and the fuel pump and also make sure that the fuel pump is in perfect condition. The carburetor should be disassembled and thoroughly cleaned to make sure that all jets and passageways are clear. The next step would be to insulate the gasoline line from the fuel pump to the carburetor either by wrapping the line with asbestos or by building a metal shield between the



Bill Toboldt, Editor, Motor Age

line and the engine so that the heat radiated from the engine will not affect the gasoline in the fuel line and cause a vapor lock condition. Another step is to install a thick gasket between the carburetor and the intake manifold. This gasket should be approximately $\frac{1}{2}$ to $\frac{3}{8}$ in. thick.

Another thing you should be sure of is that the engine is properly tuned. Go over the spark-plug gaps, breaker-point gaps, and valve-tappet clearances to be sure they are properly adjusted.

Reinstalling Pistons

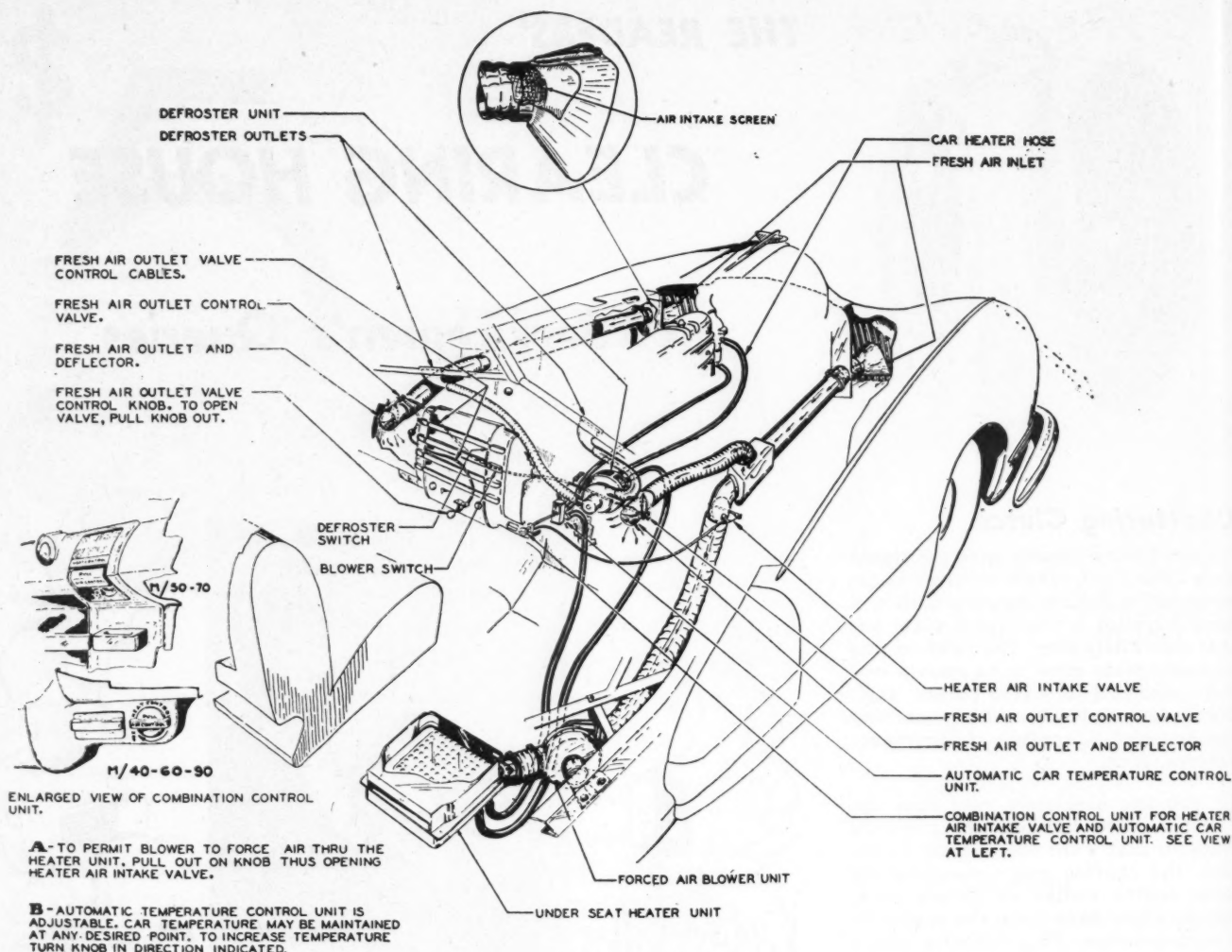
I am putting new rings in a 1933 Packard V-12 motor and I am having trouble getting the pistons back into the motor, due to the fact the cylinders are bored on an angle in relation to the face of the block. Ring compressor will not work. I am unable to get four pistons up from below on each end of the motor. Counterbalances on crank shaft do not permit room. It is possible to put the

four center pistons in from below, as there are no counterbalances on crank shaft in this group. How can I best do this job?

Will you please tell me how the connecting-rod bearings should be adjusted on this job? The rods do not carry inserts; they are solid. I would also like to know if the bearing caps should be filed for adjusting like an ordinary solid bearing.—Peer's Garage, Berkeley Springs, W. Va.

IN as much as the 1933 Packard V-12 has pressure-lubricated bearings in the engine, it is not advisable to adjust the connecting-rod bearings. Should the caps be filed, it will result in an oval-shaped bearing, and consequently an excessive amount of oil will leak and you will have an oil pumper, as the piston rings will not be able to control the excess oil thrown on the cylinder walls.

Of course, many mechanics have filed these bearings in an emergency or when they were unable to obtain new rods. However, it is considered poor practice and most manufacturers



Car Heater Layout, 1942 Buick, Series 90

refuse to accept old rods for rehab-bitting if the caps have been filed.

On this Packard, the pistons are removed from the top of the block, but the connecting rods are removed from below. In other words, after removing the connecting rod caps, push the piston-and-rod assembly up as far as it will go and then, after removing the wrist-pin lock, push out the pin and remove the piston. Then drop the rod and remove it from below. Naturally, to install the pistons and rods, the reverse procedure is followed.

Blows Gaskets

I have a Nash Lafayette 1220 model, 1938, that blows head gaskets about every 1500 to 3000 miles; it blows between No. 2 and No. 3 cylinder or between No. 4 and No. 5. I understand this motor was very hot when it blew the first one. I believe the head or block is warped. How is a good way to check these? It seems the gasket gets hot and turns black at these points, then just blows out. We have been tightening it with a tension wrench to 55 lb., then, after about 50 miles, reset it with the same wrench to same tension.

Wonder if you could help me out on this one? We have put in seven gaskets in about 14 months.—A Texas Subscriber.

BELIEVE you have hit on the right cause of this trouble because it certainly sounds as though either the head or the block of this engine is warped.

It should be easy enough for you to check this by removing the head and, after cleaning off the carbon, check the surface with a straight-edge to see just what distortion has taken place. You can check the block in the same manner. Naturally, if you find either the head or the block to be warped, it will have to be planed off to a level surface or replaced.

Solenoid Quits

I installed an ignition coil on a 1940 Model 120 Packard and, upon trying out the car, we found the solenoid switch, which operates the overdrive when pressing accelerator to the floor, did not work. I connected the old coil again and everything was O.K. Then I changed my connections and used the same primary feed that supplied

the old coil, but it still does not work.

I realize that you cut off the ignition for a moment when you press accelerator to the floor, but what I want to know is why it will not work with the new coil when it is wired the same as the old coil. Thanks for any help you can give me.—S. E. Sheffer, 112-114 W. 21st St., Baltimore, Md.

THE only reason I can see why the solenoid switch would not operate with the special coil is that, possibly, the primary of the coil had too high a resistance or has some other characteristic which prevented the solenoid from operating. Either that, or the coil itself might have been defective. I would suggest that you check the new coil to make sure that it is in good condition. However, my guess is that the primary of the ignition coil is different from the standard equipment coil and is causing your trouble.

Blow-by

I have a Buick 1938 Special Eight in which I get an odor of oil. In fact, while driving during the day, I can actually see blue oil smoke in the

front driver's seat. What causes this? How can I correct it?

I also get a screaming sound that seems to be the clutch release bearing sticking. It comes and goes. How can this be oiled and freed up without pulling the clutch and transmission?

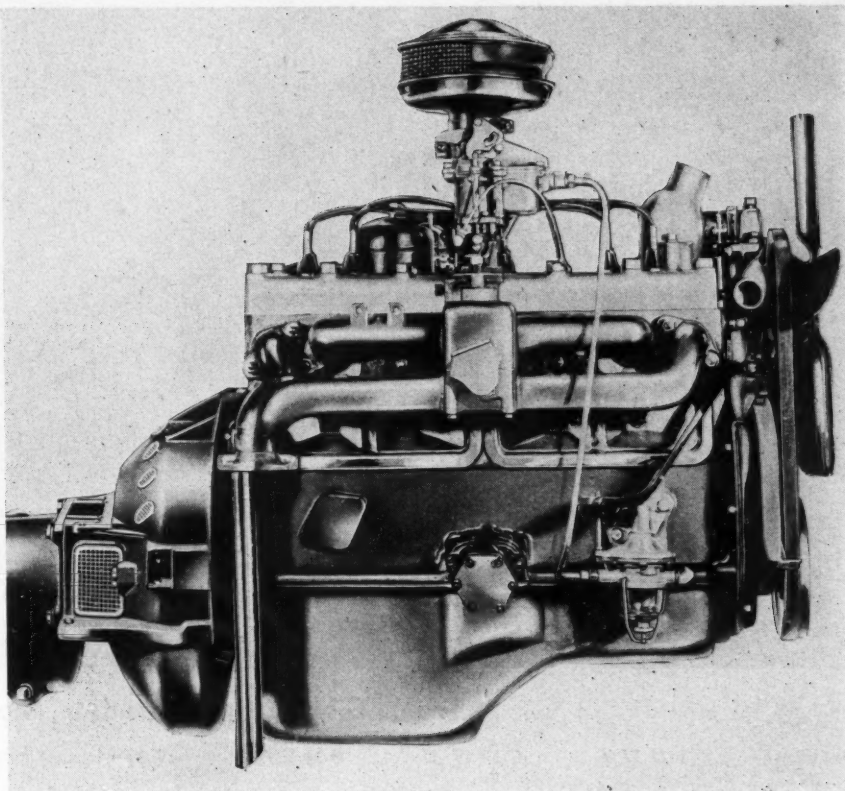
The car just had a tune-up and minor repairs but still seems very slow and sluggish on pick-up. In high gear, it isn't bad but in first and second it is very slow. What causes this? I have installed new plugs and points.
—Germain George Busack, 3221 N. 30th St., Milwaukee, Wis.

THE odor of oil and the smoke fumes you are experiencing on a 1938 Special Eight Buick are the result of worn cylinder walls, pistons, and rings. When these parts are worn, compression gases leak past the pistons and out through the crankcase. This condition is known as blow-by and can be overcome, of course, by complete reconditioning and the installation of new pistons and rings.

The screaming noise you describe quite possibly comes from the clutch-release bearing or clutch-pilot bearing. However, these are sealed bearings and should require no lubrication for the life of the car. If these are the source of your trouble, it would, of course, be necessary to remove clutch and transmission so that they can be replaced.

The cooling system capacity of this car is 13¼ qt. The crankcase capacity is 6 qt. and the maximum output of the generator with the generator hot is 25 to 28 amperes at 8 volts and 4200 r.p.m. Oil pressure is 45 lb. at 35 m.p.h., the adjustment being located in the oil pump.

The fact that this car has poor pick-up probably results from the worn condition of the pistons and rings resulting in low compression.



Poor Gas Mileage

I have a 1941 Dodge and cannot get over 15 miles per gallon on gas and have to hold speed to 35 m.p.h. to get that. Have been unable to set timing fast enough to make motor spark knock. Have set the distributor full ahead and then the timing is so fast the motor will not idle and I still get no knock. I have checked points, condenser, tappets, plugs, and coil, cleaned carburetor, set timing with light and can't get any improvement.

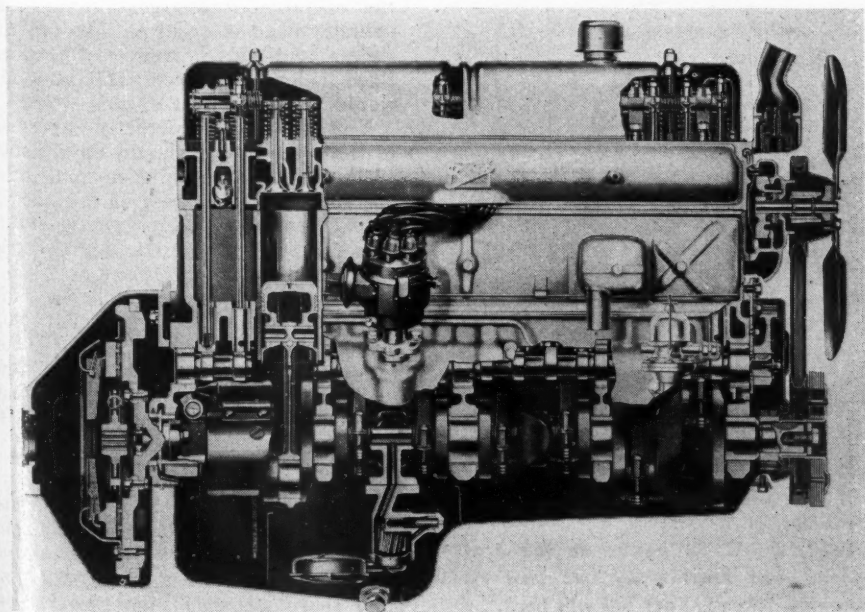
Have checked everything but the timing chain. Could this be late in time on valve action and is there any way of checking on it before I pull it

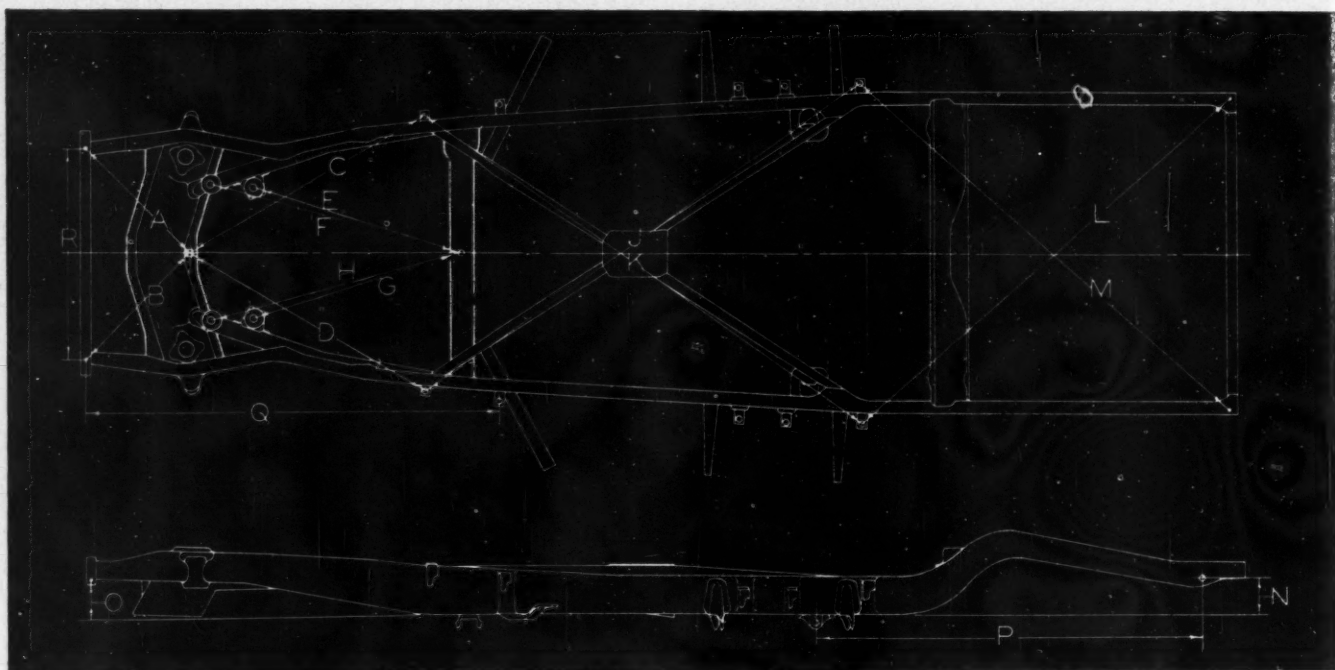
down? The motor idles perfectly and doesn't seem late. The top speed of this job is about 82 m.p.h. and seems sluggish after it gets warmed up. I'm stuck. Will you give me some dope on this? The compression is around 100 on all cylinders and engine uses no oil. The car has 39,000 miles on it.—Eugene Risher, 301 N. Mulberry St., Spencerville, Ohio.

THE first thing I would suggest doing on your 1941 Dodge would be to give it a complete carbon-and-valve job as standard compression is 125 lb. at cranking speed. When installing the cylinder head, be sure all the cylinder-head nuts are pulled up equally, preferably with a tension wrench.

To check the valve timing, adjust No. 1 intake valve to .011 in. and then turn the crank shaft until No. 1 piston is coming up on the compression stroke. Continue cranking until No. 1 intake valve is just beginning to open, which should be nine degrees before top center. The vibration damper is calibrated in degrees, so the intake valve should open when the ninth graduation on the vibration damper lines up with the pointer. For running set the intake tappet to .008 in. and the exhaust valve to .010 in. Breaker point should open at top dead center.

You speak of having cleaned the carburetor. However, I would clean it once more and, when the carburetor is disassembled, I would install a new economizer valve, as it is quite possible that the present one is defective and is leaking fuel. With a defective economizer, the engine would still idle satisfactorily but would use excessive





Frame Diagram, 1942 Hudson, Model 24

A-21 3/16 B-21 3/16 C-39 25/32 D-39 25/32 F-37 5/8 H-37 5/8 J-78 3/4 K-78 3/4 L-74 41/64
M-74 41/64 N-4 15/16 O-5 49/64 P-57 5/64 Q-59 15/16 R-30 1/2

fuel at all speeds above idling. I am quite sure you will find the trouble is in the carburetor. This is borne out by the fact that your top speed is quite satisfactory and you do not have any pinging, which would naturally be the case where you have an excessively rich mixture.

Oil Pressure Low

I have a 1937 Studebaker, Model 6A, which the customer ran when it was low on oil. He burned out the front rod and loosened the rest of the rods and mains. He flattened the front throw of the crankshaft .022 in., which made it necessary to remove the motor and remove crankshaft and have this throw reground. The rest of the rod throws were worn only .001 in. so we did not have the rest of them reground. The main bearings were also true within .001 in. The car only has 26,000 miles on it. We installed new main bearings and new rods and a special bearing on the No. 1 throw.

When the motor is cold, it has about 50 lb. pressure at about 40 m.p.h., and about 10 lb. idling. When I drive it about two miles, the oil pressure is good until it idles, then it drops to about 2 lb. I have increased the spring tension on the relief valve but this does not bring the pressure up at all on the idle part. The pressure is about 35 lb. when the motor is hot and running at about 40 m.p.h., but when idling it drops to zero.

I talked to a man who has worked on these cars for about 20 years and he says that this model should have

about 5 lb. idling and about 40 lb. at 25 to 30 m.p.h., with the motor hot, but, when I drive at 30 m.p.h., I have only 25 lb. pressure.

Could my trouble be that the camshaft bearings are also bad and need replacing? If so, is there any way to fix it without taking the motor out again? Could there be a camshaft plug purchased to cut down the oil flow to the camshaft bearings like the ones used on Chrysler cars? This car

has plugs on the valve side of the motor.—An Iowa Subscriber.

FROM your letter, I am inclined to believe that the work you have done on this car is all right. It is quite possible, of course, that the camshaft bearings are worn, particularly in view of the fact that so much damage was done to the crankshaft when this engine ran out of oil.

The camshaft bearings in this car are the split-type steel-back with bab-bitt linings. The camshaft is removed through the front of the engine, which means that you will have to remove the radiator, timing-gear cover, and cylinder head in order to take out the valves and valve lifters. Our Flat Rate Operations Nos. M1 and M7 would cover the cost of this work.

You have been correctly informed in that this model should have about 40 lb. of oil pressure at normal driving speed. To the best of my knowledge, there is no metering plug available for this car similar to the type used on the Chrysler products.

Before you get into this job further, however, I suggest that you make an oil-pressure or leak test of the bearings. Then you will know just where the trouble is, and what work will be necessary to correct it.

High Oil Consumption

We have a 1941 Packard, Model 110, with about 32,000 miles on the speedometer. The car when purchased had about 3000 miles on it, but for some reason I think it had more miles



"Well, well! So you're on the draft board that drafted my two best mechanics. Hmm! Your bill will be . . . !"

than that. This car used oil the day it was bought. We examined the motor for leaks and could not find any. It doesn't seem to smoke but uses about 1 qt. of oil every 100 miles and the car does not have to be driven very fast to use this amount.

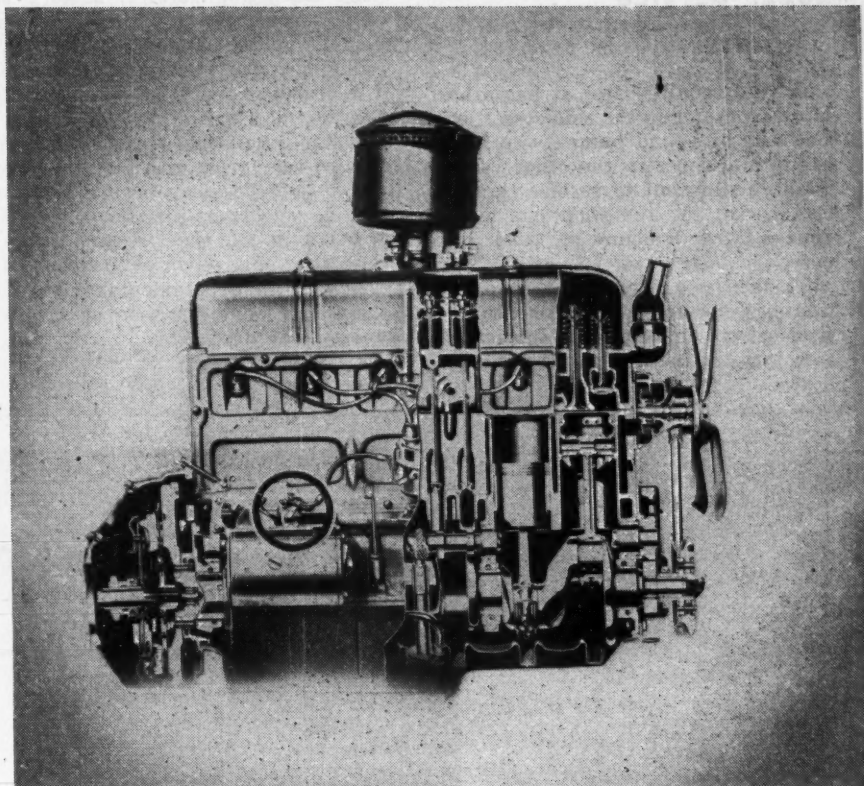
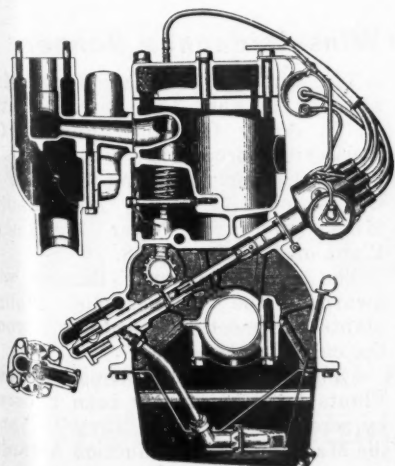
We overhauled this car at 28,000 miles, put in new rings, connecting-rod inserts, ground valves, and did everything that we thought needed replacing except main bearings, which were not replaced. The oil pressure seems to be good, 40 lb. at 25 m.p.h. It still uses the same amount of oil as before it was overhauled.

The reason I think there were more than 3000 miles on this car when it was purchased by our customer is this: When we cleaned the pistons, they were marked .010 oversize. Why should they be that size when the car was supposed to have been almost new is beyond me, unless something happened to the motor and it was rebored to this size. Hope you can solve my problem.—Frank's Auto Sales, Black River Falls, Wis.

ON your 1941 Packard that is using so much oil, I am inclined to think you will find the trouble in a defective diaphragm in the fuel pump. Some of these models were equipped with a vacuum pump, which operated the windshield wiper, and, if this diaphragm is defective, intake manifold vacuum will draw oil right out of the crankcase and into the engine.

If such is not the case, you have a leak of some sort, and I would suggest that you tie a large piece of oil cloth underneath the engine and then take it for as long a drive as your ration coupons will let you and then see how much oil you have accumulated in the cloth.

In this connection, I would recommend that you make an oil-leak test on this engine and, if you do not have the necessary equipment, you can undoubtedly borrow it from your local automotive jobber. This will show clearly which bearings, if any, are leaking excessive oil, and from then on it should be easy enough to repair.



Miss at 20 m.p.h.

We are having trouble with a 1941 Chevrolet, which has been driven 21,000 miles, and has a bad miss between 20 and 25 m.p.h. We have refaced and reseated the valves, replaced valve springs, points, condenser, and installed new carburetor, coil and plugs. Compression is even and vacuum checks O.K. The owner says car has had this miss since it was new.—Eastlake Motor Service, 1608 Eastlake Ave., Seattle, Wash.

AFTER carefully studying the miss you are experiencing on a 1941 Chevrolet, I would suggest that the difficulty might be caused by the spark plugs and some mechanics have overcome such trouble by drilling and tapping the spark-plug holes to receive a 14 mm. plug.

Of course, I am assuming that you have checked the entire ignition system, including the coil, breaker points, distributor, wiring, battery ground and engine ground, and ignition switch. If you have checked all these points, I would suggest the installation of the larger plug.

Brakes Click

We have relined the brakes on a 1936 Lafayette car which has mechanical brakes. The brakes click something awful when you go backward and also when going forward. They do not click all the same time. They click one right after the other in rapid succession. We have tried everything we know of and all any-

body in this town knows of, so please let us hear from you soon so we can try what you have to suggest.—A Missouri Subscriber.

I BELIEVE the difficulty you are having is due to incorrectly located brake shoe anchors, or to the incorrectly installed brake shoe return springs.

My suggestion is that you readjust these brakes as follows: Jack up the wheel and turn the eccentric adjustment until you have exactly .010 in. clearance at the adjusting-screw end of that particular shoe. Lock the eccentric in this position.

The next step is to loosen the anchor-bolt lock nut and shift the anchor until you have exactly .010 in. clearance between the drum and the lining of that same shoe. Lock the anchor in that position.

The next step is to expand the shoe with the notched adjusting screw until both shoes are out against the drum and the wheel can just barely be turned over, using both hands. Next back off the notched adjusting screw until the wheel is free of any drag from the brake lining.

Repeat this operation on the other three wheels. This adjustment will provide the proper position of the brake shoes within the drum and will set the shoes pretty close to the drum itself, so that there is very little travel of the shoe when the brakes are applied.

Next, try switching the brake-shoe return springs. Maybe you have the primary springs on the secondary shoes.

Super Service

(Continued from page 23)

shop and repair shop. It has a half-block frontage on the side street, with two sets of island pumps, two in one group and three in the other. There is space sufficient to service the largest trucks, for the shop has always done a large amount of truck business.

The services offered at the gas station and adjacent departments consists of gas and oil sales, lubrication, washing, polishing, accessory sales,

tire sales and service, battery sales and service, brake work, wheel alignment, motor tune-up, motor repair, and electrical work. The firm does practically everything except body and fender work.

War conditions, however, have curtailed very greatly the volume of work done—not because there is not plenty of work to be had but because of lack of help. At the present time, the firm has only seven employees to take care of all departments of the business and some of these are not experts.

No advertising or other promo-

tional work is done at present. The gas station feeds the shop all the retail repair business it can handle. Although the shop is in the wholesale parts business. No retail prices are cut.

Gas sales, naturally, have been much reduced, but the lubrication department continues to do a considerable business, and is the best feeder for repair work of any of the departments of the business. "It is surprising," says Grawey, "how many profitable repair jobs we obtain from the lubricating lift."

Wheel aligning and frame straightening are also a profitable part of the business.

The station is an official tire-inspection station. All minor repairs of tires are done in the station, but vulcanizing and retreading are sent out. In the battery department, a quick charger is used. Overhead washing equipment is used so that a good job of washing is quickly and efficiently done.

"With adequate man-power," says Grawey, "we could do a tremendous business. As things are, we do our best to take care of our old customers and the new ones come in through our service station. It's lucky that we never specialized. We do a little of everything and make a profit on every thing we do."

Wholesalers Elect

Alexander J. Whiddon, Dothan, was elected president of the Alabama Automotive Wholesalers Association to succeed Nelson P. Hury, of Bessemer, and W. R. Sims, Montgomery, was re-elected executive secretary at the annual convention of the organization at Montgomery. The new executive board is composed of W. H. Henderson, Birmingham; Mrs. Clark Hearn, Anniston; J. C. Barker, Mobile; D. D. Baker, Pensacola; Hury and Whiddon.

Some 200 members of the association and invited representatives from Mississippi, Florida, Tennessee and Georgia, attended the one-day meeting. The chief speaker was Tom O. Duggan, of Thompson Products Co., Cleveland.

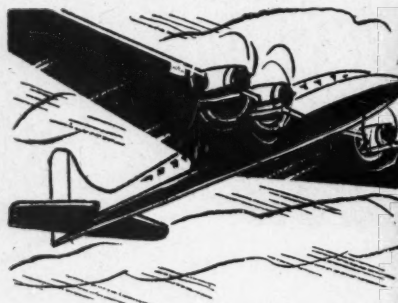
Wins Ordnance Banner

The Minneapolis Moline Power Implement Co. has been awarded the U. S. Army Ordnance Banner for meritorious production.

This banner was being awarded to the Automotive Plant, Minneapolis, Minn., and the Power Machinery Plant of Hopkins, Minn.

The Army Ordnance Banner was awarded the Minneapolis Moline plants for meeting schedules beyond the call of duty.

Individual Minneapolis-Moline Plants have previously been honored by receiving the Army-Navy "E" and the Maritime "M" Production Awards.



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11 MODELS — \$335.50 to \$2900



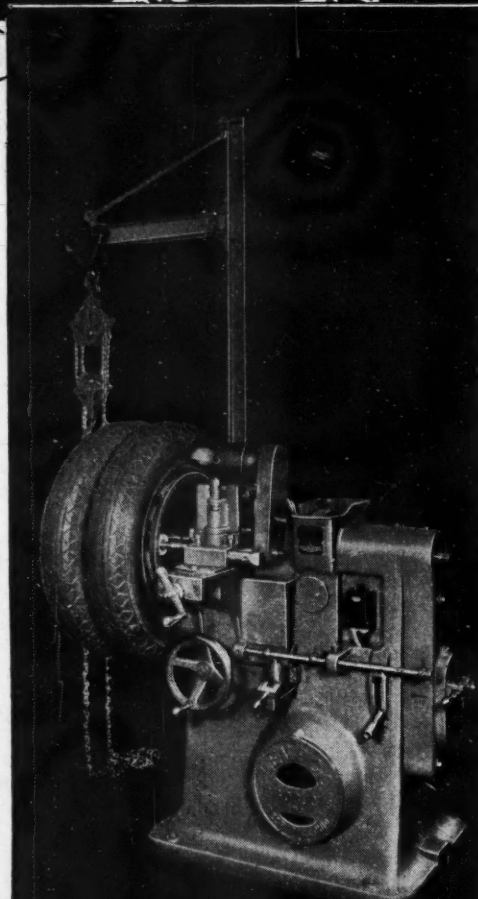
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One set-up for mounting all pressed steel shoes (used on all passenger cars and light trucks). Another set-up takes care of cast shoes used on heavy trucks. Junior and Senior Models.

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Right now, of course, our job is doing our part to help win the war . . . not only making parts for our fighting machines, but also cooperating with your McQuay-Norris jobber to help you repairmen and car dealers keep America's cars, trucks and tractors rolling on the home front. And after the war, as a result of the experience we are gaining now, you can count on your jobber to supply you with even finer McQuay-Norris precision replacement parts.

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DECEMBER, 1943

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51



"Were we directed from Washington when to sow and when to reap, we would soon want bread."

Thomas Jefferson

Towns You "Auto" Know

THERE are thousands of towns in the United States, but the ones automobile men really "auto" know about are the ones named in honor of the automobile, its parts, and other relative subjects.

This is no joke—for in West Virginia, there is really a town named "Auto," and if you take the time to thumb through a fat publication of the government, known as the "Postal Guide," you can find, maybe not enough parts to build an automobile, but quite a few, just the same.

Starting with "Block" (Tenn.), you can add "Hub" (Miss.), "Hood" (Cal.), "Light" (Ark.), "Fender" (Ga.), "Spring" (Tex.), "Belt"

(Mont.), "Top" (Ore.), with a battery from "Battery Park" (Va.), to make the necessary "Sparks" (Ga.). There are also two "Points," one in Louisiana the other in Texas.

Accessories might include a "Siren" (Wis.), "Spot" (N. C.), "Radio" (Mont.), or "Heaters" (W. Va.).

To run your "Auto" (W. Va.), you can use "Gas" (Kan.), or "Gasoline" (Tex.), oil from "Oil Trough" (Ark.) and water from "Waters" (Mich.). You don't have to worry about "Ayr" (Neb.) for you've only got two "Tyres," the "Tyre" in Michigan, and the "Tyre" in Pennsylvania.

Of course, if you prefer a standard make, rather than a makeshift job,

you can choose from "Buick" (Mo.), "Chevrolet" (Ky.), "Dodge" (Mass.), "Ford" (Kan.), "Chrysler" (Ala.), "Plymouth" (Cal.), "Cadillac" (Mich.), "Packard" (Ky.), or "Nash" (N. D.), to name a few.

Body styles may be selected from "Sedan" (Ia.), "Coupeville" (Wash.) or for utilitarian purposes—"Trucks-ville" (Pa.).

Like all machines, cars are bound to need "Service" (Ala.) to keep them in condition for the duration of the "War" (W. Va.), whether it's removing a "Carbon" (Ind.) knock to make the "Motorun" (Va.) smoother, or a "Boreing" (Ky.) job. However, if your shop gets too "Busy" (Ky.), don't "Worry" (N. C.) about a "Helper" (Utah).

For a man to do the job, go to "Mechanic Falls" (Me.), "Mechanicsburg" (Ill., Miss., Ohio, Pa., or Va.), "Mechanicstown" (Ohio), "Mechanicsville" (Conn., Ia., Md., Pa., or Va.); or "Mechanicville" (N. Y.).

Well, anyhow, when the "Job" (Ky.) is done, and the "Driver" (Va.) is "Wheeling" (W. Va.) along the road in "High" (Ark.), he'll be a "Happy" (Texas), and so will you, in the knowledge that the work you did for him has put a lot more "Miles" (Ia.) on the old bus. If you can't keep this straight, think about the postoffice department.—Paul Vandervoort II.

Chrysler Men Shifted

F. L. Dickerson, formerly regional manager at Detroit, has been transferred to Washington to direct a new region comprising territory formerly handled by Philadelphia and Greensboro, N. C., for the Chrysler Division of Chrysler Corp. J. C. Clem, formerly district manager, has been named regional manager of the new Memphis region. George C. Merrill, formerly district manager, becomes regional manager at Denver, while Frank E. Copeland has been appointed factory representative in the newly created Houston region.

Heads Used Car Section

Orton P. Hufstader, of Decatur, Ill., has been appointed head of the OPA Used Car and Trade Relations Section of the Automobile Rationing Branch. He has been active in car rationing ever since the OPA undertook the work.

Hufstader, before going with the OPA, was with General Motors and later was a Buick dealer.

Gouldman Moves Up

Earl Gouldman, formerly assistant zone manager and business management manager at Atlanta, Ga., has been appointed business management manager of the Pontiac Motor Division of General Motors.

To America's Automobile Dealers

*A holiday greeting from
Studebaker*



STUDEBAKER sends its greetings to the automobile dealers of America this holiday season... You've made a magnificent contribution to your country's success on the battle front, through your work in maintaining the irreplaceable cars and trucks on the home front... You've established a needed wartime market for the sale and purchase of used cars and trucks... You've helped place in the proper hands the limited supply of new cars and trucks built before production stopped... You've been hit hard by restrictions but you've stood by your guns—because, as real Americans, you knew that your country needed you and the things you could do... Studebaker is proud to be part of an industry to which your initiative and steadfastness have contributed so much.

THE STUDEBAKER CORPORATION

Pioneer and Pacemaker in Automotive Progress

Wartime builder of Cyclone engines for the Boeing Flying Fortress... multiple-drive military trucks... other vital war matériel

Pistons and Rings

(Continued from page 33)

Tommy rubbed his nose reflectively. "But why does a cylinder get out of round?" he asked. "The piston travels straight up and down."

"That's a fair question," admitted Pop. "The piston travels straight but the forces actin' on it don't. Lookin' at 'em from the front, most gaso-line engines revolve clockwise. That means that on the power stroke the con rod travels like this." He imitated the downward stroke of the

piston, pulling the connecting rod to the right in the path it would travel if it were attached to the crank pin. "Now what's that do? Why, the piston is slapped harder against the right side of the cylinder wall than against the left, and wears it faster. Eventually the action wears the cylinder—and the piston—outa round."

"There isn't much you can do then, is there?" said Tommy.

Pop put down the assembly and stepped over to the car from which it had been taken.

"There's plenty we can do," he said. "We can refinish the cylinders or

punch new holes in it, as some of the boys say. We take a special grinder called a borin' bar, and rebore the cylinder till it's a perfect circle from top to bottom. Or we can hone it till it's smooth as glass again, and our trouble's licked. Some shops do both. That is they first rebore the block and then follow that with a hone."

"But," said Tommy, "if the pistons were worn too much before, they wouldn't fit at all after you made the cylinders bigger."

"You figured that one out, all right. They wouldn't fit and we couldn't use 'em. We'd just put in oversize pistons."

"Oh."

"Even if we had to take a lot of metal out of a cylinder," continued Pop, "we could put in cylinder liners. But we don't do that much except on heavy-duty jobs."

"Now there's another stunt a lot of men use and that's called partial honing. They run a hone through the cylinder just enough to break the glaze and true it up. By doin' that the new rings will seat quicker and you get rid of the worst of the taper and out of round. Another thing you don't want to forget to always remove the ridge from the top of the cylinder."

"Now," said Pop, returning to the bench and picking up the piston-and-rod assembly again, "we can get back to that question you asked about rings a minute ago. On passenger-car engines like this one, there's three rings. The top one's called the compression ring and the lower two is oil rings."

"A gasoline engine is only as good as its compression. It's somethin' like a rubber ball. The harder you compress it when you throw it against somethin', the harder it will expand, or bounce. Modern passenger-car engines is built to operate at compression ratios of 6 to 1 or even as high as 7½ to 1. That means the charge of vaporized gasoline is bein' squeezed into a space only a sixth or a seventh as big as it was when the piston was at bottom center."

"Now, if the compression ring ain't doin' its job—if it's lost its tension or the groove clearance is too great—why the charge slips past it and ain't compressed. When the charge is fired, you don't get all the power you should."

"Now the oil rings is another matter. It's their job to scrape the excess oil off the cylinder walls as the piston descends. They have slots in 'em so the oil can get through to the grooves in the piston and then through the drain holes to the inside of the piston. If the oil rings is worn, the oil stays on the cylinder wall and the hot gases from the power stroke burn it. Oil consumption goes up and spark plugs and the valves get fouled."

"Different makers have different ideas about how piston rings ought to work and how they ought to do it."

(Continued on page 56)



● A problem which has always been troublesome in servicing gasoline, oil and brake lines made of steel tubing, is the matter of flaring this tubing for fitting connections. When the ordinary flaring tool is used, the tubing frequently cracks or splits.

The new Imperial 93-FB "Double-Flaring" Tool solves this problem because it folds the tubing back as shown in illustrations to make a flare with double-thick, double-strength walls.

Tool is small, simple, convenient to work with right on the job. No vise . . . no hammering . . . is necessary. One economical tool handles 3/16", 1/4", 5/16", 3/8", and 1/2" O.D. thin-wall soft steel tubing. Also makes single or double flares on copper or aluminum tubing. Ask for Bulletin No. 337

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1. Flaring cone on tool is first screwed down with proper size adapter in place in tubing. This bells tubing as shown in cross-section view at left.

2. The cone is then backed off slightly, adapter removed, and cone screwed down just as on a conventional flaring tool. This folds back end of tubing and makes a correct 45° flare with double-thick walls.

★ ★ ★

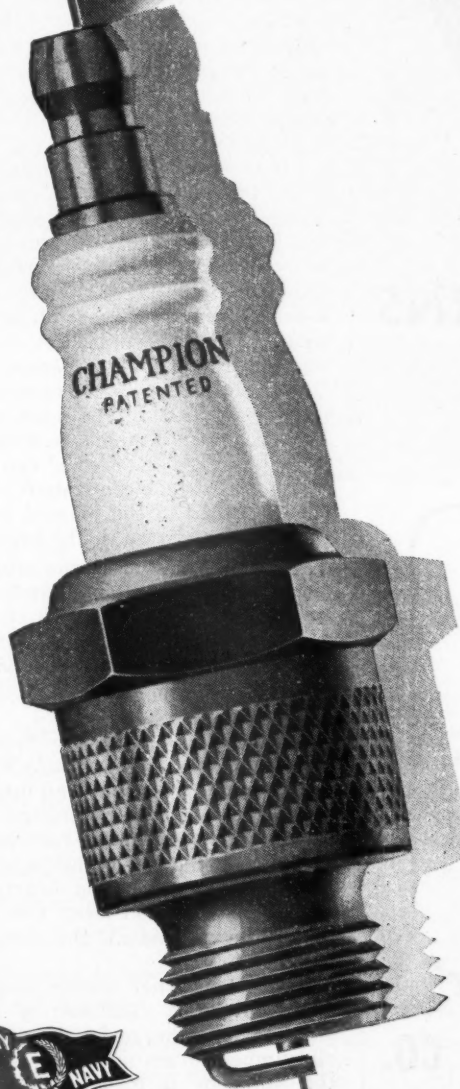
No. 93-FB Double-Flaring Tool complete in metal kit. Dealer's cost \$7.00

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In the year drawing to a close, Champion Spark Plugs have been produced *in quantities and at a rate practically double* that of any peacetime production.

This enormous outpouring of Champion Spark Plugs for every type of engine on land, water, and in the air; on the war front, and on the home front—upon which our armed forces and our Allies had first call—serves to emphasize the vital part played by spark plugs in the daily lives of all of us.

Thus, too, Champions are adding to their reputation for better performance and dependability with vastly greater numbers of users throughout the world than ever before. The moral to spark plug dealers is plain—when Victory is ours, Champions are destined to be the preferred spark plugs by a still wider margin for every engine and for every operating condition.



"LET FREEDOM RING" BUY WAR BONDS

Pistons and Rings

(Continued from page 54)

There's somethin' to be said for all of 'em.

"It's smart to install rings so the gaps don't come one right over the other. When you stagger 'em, there ain't much chance for blow-by.

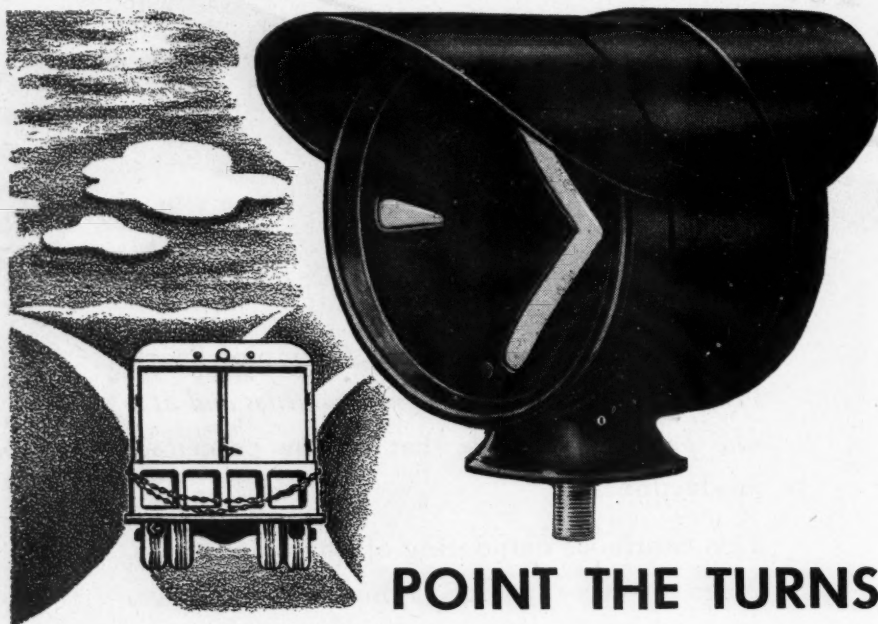
"Then, as I mentioned a while back, there's the expander rings. These keep the ring tight against the cylinder wall all the time, so that there is little chance of the ring bouncin' or flutterin' off the cylinder wall as it travels up and down. They can

overcome a certain amount of wear and besides that makers claim they reduce wear."

"It seems kind of funny," said Tommy, shifting his weight from one foot to the other, "how rings like that could keep down wear."

"Well," said Pop, putting down the assembly, "they do it by eliminatin' a couple of things that hasten wear. One of the things that cause rapid wear is too small a gap, and don't forget that a good piston ring will see that the cylinder walls are not starved for oil.

"But there's some other things that make for rapid ring wear. For ex-



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STOP LIGHTS
TAIL LAMPS
DOME LIGHTS

ARROW

SAFETY DEVICE CO.

MT. HOLLY, N. J.



"Did you notice that reference to me in the factory ad — 'Home front here'?"

ample, a bent con rod will wear rings uneven. Sometimes an oil line clogs or somethin' else goes wrong with the system, and too much chokin' will wash the oil off cylinder walls and cause wear. Incidentally, kid, you know there's different kinds of engine lubrication, don't you?"

"Why—I—"

"Well there is. The most common is the full-pressure system that's used on almost all heavy-duty engines and lots a passenger cars. The oil pump is located at the bottommost point in the oil pan and pumps the oil through a passage called a header line. Sometimes this is built into the crankcase and sometimes it is a separate tube. In any case, there's an opening from this line to each of the main bearin's. Now the main bearin's is grooved, so the oil reachin' the bearin' can in turn be forced into the crankshaft. There's a hole drilled in the journal to match up with the groove in the bearin'.

"The oil passage in the crankshaft leads through the crankshaft cheeks to the crankpins so the oil can lubricate the con-rod bearin's. Sometimes the con rod itself is drilled and the oil is forced up through the rod to the wrist pin.

"The other principal system is called the splash system. This has two oil pans, lower one and upper one. The upper pan is high enough for the oil dippers on the con rods to reach the oil. The dippers sort a scoop up the oil for the con-rod bearin's and also splash the oil over the pistons and cylinders and all the other bearin's.

"There's another system used sometimes that's a combination of the other two. The main bearin's have oil pumped to 'em under pressure, but the con rods is oiled by the splash system."

"Which is best?" asked Tommy.

(Continued on page 58)

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that keep the Wheels Turning!

We've got some tires, and we've got some gasoline. We can make them do!

But we *can't* replace vehicles that are put on the scrap-heap by mechanical neglect or failure.

With an estimated *four million* vehicles *already lost to use*, the cars, trucks and buses we still have *must* be kept moving . . . This takes *parts*—*good parts* that you can depend on to fit, and to stand up in service.

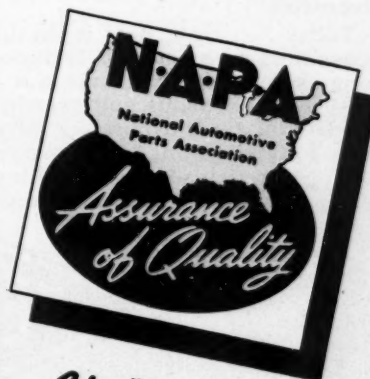
And it takes *all* the skill, and *all*

the time, that you and every other good mechanic can put in on the job itself. It leaves *no time to waste* in shopping or waiting for the parts you need.

You can rely on the known names and known quality of the more than fifty essential lines bearing the NAPA Seal—and the prompt, *complete* service you get from your NAPA jobber—to help you get the job done—and *done right!*

NATIONAL AUTOMOTIVE PARTS ASSOCIATION

Executive Offices: 705 Fox Building, Detroit 1, Michigan



*Your
NAPA Jobber
is a Good Man
to Know!*

Pistons and Rings

(Continued from page 56)

Pop grinned. "As you get older, kid," he said, "you won't ask a man to go out on a limb like that. All three systems have their points. Some are better under certain circumstances, other under different conditions. I just described 'em to you so you'd have an idea of what they're all about. When we get around to talkin' about bearin's, there's a lot more I'll be able to say about lubrication."

"I want to learn something about

bearings," said Tommy. "We broke down driving to the shore last summer and Dad said a bearing burned out. He couldn't describe it very well but it sure did make a lot of racket."

"You'll be learnin' about bearin's, all right," said Pop. "In fact, I was hopin' we could get to 'em today. But we been so long on pistons and rings I guess we'll have to let 'em go till next time. I hope you're stickin' some of this information away in your memory."

"Most of it, I guess. I'll be able to remember better once I work on an actual job."

"Sure, you need practice. Everybody does. But don't overlook theory, kid. I could stand here all day spoutin' theory at you, and you wouldn't be able to do a job by yourself. But, on the other hand, you could do a job a dozen times, followin' directions, and the first time a job came along that was a little different you'd be stumped. You wouldn't know enough about the theory to help you dope out the trouble or the remedy." He looked at Tommy sharply. "Ever read a book on fixin' automobiles?"

"No, but I sure would like to."

"Fine. I'll dig one out for you. Now," he added, as he took a step toward the office to intimate that the lesson was over, "you better go over and see how Larry's gettin' along. If he wants to bawl me out for stealin' you, tell him I'll be in the office."



Get Acquainted with FEL-PRO Now!

Today Fel-Pro is engaged in an all-out program of gasket development and production for war needs. Tomorrow you will profit by the new and improved gaskets which today's accelerated emphasis of gasket development will make possible. You can depend upon it that Fel-Pro will have the finer gaskets and other sealing materials required by cars of tomorrow.

Today . . . right now is the time to get acquainted with Fel-Pro. Today . . . and as long as consistent with the war effort . . . Fel-Pro's new plants and greatly expanded production make it possible for us to continue to provide you with those gaskets and sealing materials so indispensable to your job of keeping America's cars and trucks rolling!



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- ★ *Keep 'em Rolling* ★
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- ★ **GASKETS**—for every automotive application. ★
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Oil Filters

(Continued from page 29)

and a two- to six-fold increase in cylinder and ring wear. While these experiments were performed on Diesel engines, the results are at least indicative of what occurs in gasoline engines.

Under wartime driving conditions, sludge increases very rapidly and it is not an unusual occurrence to find oil passageways completely clogged. Under such conditions, bearings are completely or partly starved for oil and soon become burned. In addition, piston scoring or sticking also results.

Oil filters are particularly effective in removing sludge from the engine oil. The accompanying illustrations, which are stills from the film sponsored by the Purolator Products, Inc., and used for training purposes in the U. S. Army, show sludge formations in a valve chamber and in an oil pan. Foreign matter removed by a filter from an engine lubricating system is also shown. Obviously, the elimination of sludge and other foreign matter from the crankcase will increase the life of engine parts, which is so important during this war period.

A. H. Williams

The passing of one of the West's industrial pioneers was mourned by thousands of friends and business connections when C. H. Williams, 81, founder and honorary chairman of the board of directors of the Plomb Tool Co., died at Los Angeles, Oct. 31.

Williams sold the first hand tool to carry the Plomb name, made in a small Los Angeles blacksmith shop in 1907. From that time until his retirement four years ago, he was a major factor in building the company from this obscure beginning to a position of leadership in the hand tool industry.



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WARTIME PROGRAM
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regular inspections and frequent recharging will prevent Battery Blackout — and assure longer battery life, especially in cold weather. When a new battery IS necessary, install Globe Spinning Power — the battery specially built for wartime replacement service.



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BATTERIES

A. A. Feldman, front center, newly appointed sales manager, presides at a meeting of the Prest-O-Lite sales organization at Indianapolis, Ind., at which sales and advertising plans were laid for next year.



7 TROUBLE-FREE Operation HANSEN AUTOMOTIVE AIR HOSE COUPLINGS



Hansen 1000 series automotive air hose couplings have been first choice in the automotive field for the past twenty years. Especially adapted for garages and filling stations they are easy to operate, leakproof, affording a great savings in air. Rugged, they will take plenty of rough usage and render trouble-free operation over a long period of time. Easily attached and detached, complete swivel action preventing kinking of hose and excessive wear.

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Low Down on Synthetic

(Continued from page 35)

Because of its availability, GR-S is the only type synthetic rubber now being used in the manufacture of civilian tires under the government program. S-3 tires, composed practically 100 per cent of synthetic rubber except for minute quantities of natural and reclaimed rubber to help in processing, have been in production since last March. These are for use on passenger cars and light trucks up to size 7.00x20 and eight ply.

First synthetic rubber truck tires produced were S-5 and S-7, manufacture of which began in July. The S-5 type has a carcass of natural rubber but the tread is synthetic rubber. The amount of natural rubber in this tire will total about 60 to 65 per cent, and the synthetic 30 to 35 per cent. The S-7 permits the same amount of natural rubber as the S-5 but it is up to the discretion of the manufacturer whether it all goes into the carcass or is distributed between the carcass and the tread. Natural rubber helps bond the tire carcass together and lessens the heat factor. Synthetic rubber has good tread wear if the carcass is preserved.

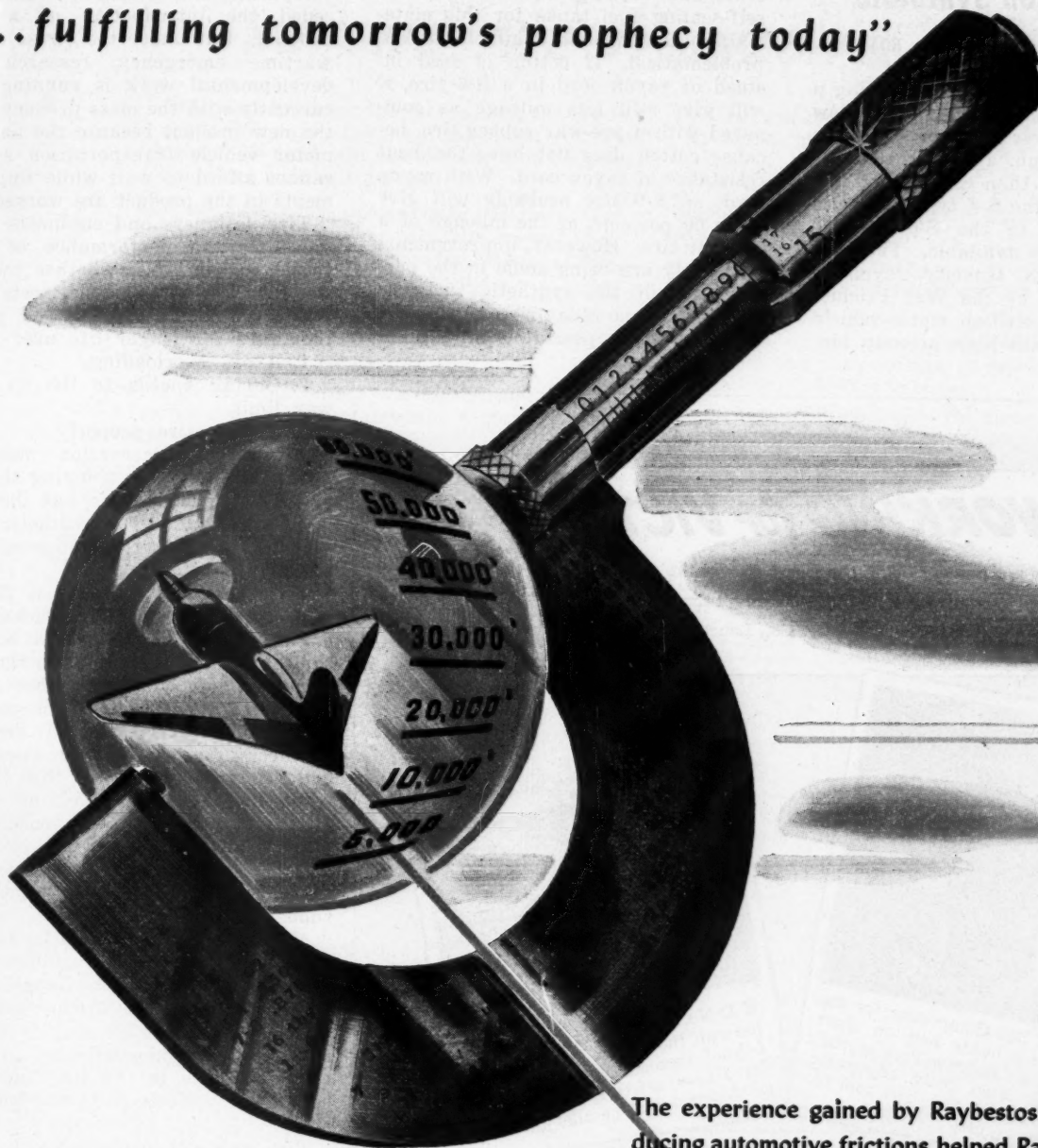
Transition is now under way to the S-6 type, which limits the natural rubber content to 30 per cent, with the remaining 70 per cent synthetic.

Ultimate upper limit for GR-S content in commercial vehicle tires appears to be 90 per cent, with 10 per cent natural rubber. This is the S-4 classification but production of this type tire, aside from those needed for test purposes, seems to be several months away.

The industry still hopes to continue the manufacture of high-speed bus and truck tires for long distance over-the-road operations from all-natural rubber until Jan. 1, 1944, and possibly later, depending upon the imports of crude rubber to this country from Ceylon, Liberia, South and Central America. It is essential from a safety standpoint that such tires contain as much natural rubber as possible to insure dependability.

(Continued on page 62)

"...fulfilling tomorrow's prophecy today"



The experience gained by Raybestos in producing automotive frictions helped Raybestos develop friction materials for aircraft. Now, in turn, this exacting proving ground of war production is resulting in still greater advancements in friction materials for you.

Experienced, skilled, resourceful, Raybestos keeps progressively ahead in every field it serves.

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BRIDGEPORT, CONN.



Raybestos
AMERICA'S BIGGEST SELLING

BRAKE LINING



Serving the War and Civilian Fronts with Friction Materials for Cars, Trucks, Buses, Tractors, Ships and Planes

DECEMBER, 1943

When writing to advertisers please mention Motor Age

Low Down on Synthetic

(Continued from page 60)

Commercial vehicle tires containing a high percentage of GR-S will blow out or throw their treads at excessive speeds of 45 mph. and upwards.

Rayon rather than cotton cord will be required in the S-4 type synthetic tires and also in the S-6 type if enough rayon is available. The production of high tenacity rayon is being increased by the War Production Board but civilian motor-vehicle use competes with high priority air-

craft and military vehicle tires and self-sealing fuel tanks for this material, so the amount available still is problematical. If cotton is used instead of rayon cord in a S-6 tire, it will give still less mileage as compared with a pre-war rubber tire, because cotton does not have the heat resistance of rayon cord. With rayon cord, an S-6 tire probably will give 50 to 60 per cent of the mileage of a pre-war tire. However, improvements constantly are being made in the performance of the synthetic tires, so what holds true today may be obsolete next month. In peacetime all the de-

velopment and research work preceded the introduction of a new product. But under the stress of the wartime emergency, research and developmental work is running concurrently with the mass production of the new product because the nation's motor vehicle transportation system cannot afford to wait while improvements in the product are worked out.

Tire designers and engineers point out that the performance of synthetic rubber tires, whether they be the S-4, S-6 or S-7 type, rests with the truck operators. Three prime requisites for longer life are:

1. Avoid overloading.
2. Curtail speeds to the 35 mph. war limit.
3. Service tire properly.

All these conservation measures also hold true for prolonging the life of natural rubber tires, but they are doubly important for synthetic tires because of their heat-generating characteristics.

Although ODT permits a 20 per cent gross overload for trucks, tire engineers are unanimous in holding that this rule is injurious to the performance of synthetic-rubber tires. This ODT sanction does not guarantee tire performance, and the tire engineers maintain that operators cannot expect synthetic tires to do what natural rubber tires did. It is all the more urgent that truck operators conserve their tires in order to allow for the mileage shrinkage that takes place in going over to synthetic-rubber tires.

Maintaining proper inflation is vital in synthetic tires. Overinflation is likely to aggravate the cracking to which synthetic tires are subject, and an overloaded vehicle only increases the injury. Under-inflation also is very injurious to the tire and tube because it subjects them to abnormal strains.

Tire cuts and bruises should be repaired promptly because they tend to spread rapidly in synthetic rubber which tears, cracks and chips more easily. A small cut will let in dirt and water and the constant flexing of the tire increases the size of the cut until it is beyond repair. This tendency to tear and crack apparently is a structural deficiency in GR-S.

One manufacturer recommends that the new synthetic passenger car tires be inspected inside as well as out every 2,500 miles for small cuts and bruises that may cause serious damage if neglected. This company also advises cross switching synthetic tires every 2,500 miles to insure even tread wear, and having wheels aligned and balanced and brakes adjusted at the same mileage. Air pressure should be checked weekly.

The proposed standard guarantee for synthetic rubber tires will be much less liberal than pre-war guarantees for natural rubber casings. The synthetic tires will be warranted

(Continued on page 64)

WORKING for VICTORY

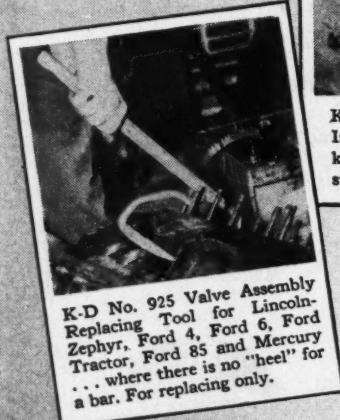
K-D Tools are proudly doing their part to win the victory, on all the war fronts as well as on the home front. You can get the ones you need for servicing essential cars and trucks. K-D Mfg. Co., Lancaster, Pa., and Hamilton, Ont



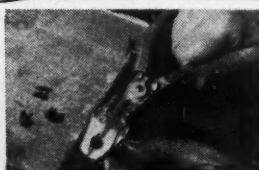
K-D No. 380 Compressor for use on valve-in-heads and on most L-heads, old and new. Fast, sturdy, versatile. Two pairs adjustable jaws furnished. Our best tool for general shop use.



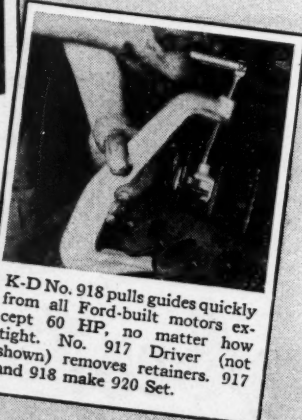
K-D No. 600 Lifter is an old favorite with thousands. Services most L-head motors. Adjustable tempered jaws, safety ratchet lock. A good, dependable parallel jaw tool.



K-D No. 925 Valve Assembly Replacing Tool for Lincoln-Zephyr, Ford 4, Ford 6, Ford Tractor, Ford 85 and Mercury ... where there is no "heel" for a bar. For replacing only.



K-D No. 605 Valve Keeper Insertor, handles most split keepers. Easy loading. Self supporting on valve stem.



K-D No. 918 pulls guides quickly from all Ford-built motors except 60 HP, no matter how tight. No. 917 Driver (not shown) removes retainers. 917 and 918 make 920 Set.

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K-D TOOLS
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BEYOND THE HORIZON... PEACE

We have come far this year along the road of battle. We know that the end is not yet, that higher hills must still be stormed, that the price of sacrifice must still be paid.

But we have come upward into the light. Our fighting men are driving back the enemy. Our ships and planes have scotched the menace of the submarine. Our cities are unseared.

And this country of ours has grown in power and resources, until it has become the greatest living force for good in the world.

Now, as we turn our faces toward the future, we can see the day of Victory dawning somewhere there, beyond the horizon.

We can go forward confident in the knowledge of our strength, the strength of millions of young men in arms, of mighty armadas of the air and the sea, of millions of workers producing unceasingly the machines and munitions that make our Victory sure.

We can go forward knowing that no nation has ever possessed so rich an endowment of materials, of skill and equipment; no nation has ever owned so great a reservoir of wealth, or so vast a

pool of war-deferred demands for all the products that make up the American way of life.

As we turn our faces toward a new year . . . as we go on here at Nash creating more and more weapons for Victory . . . as all of us at home carry on our portion of the fight . . .

Let us resolve to give, to the utmost of our power and means, to the men who fight for us across the seas.

Let us resolve to plan, now, to use wisely all the resources that this nation holds, to build enduringly the better life that is to come . . .

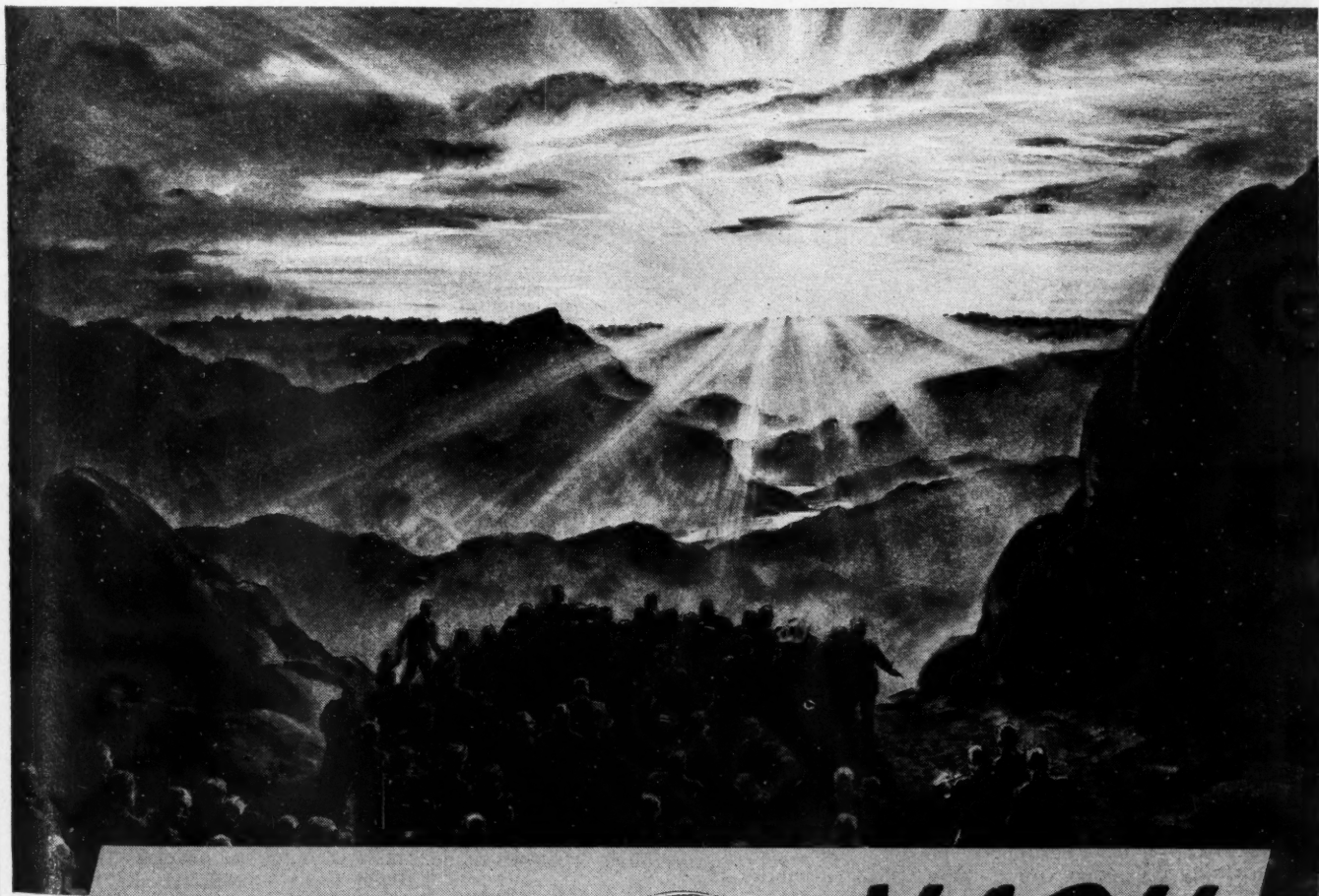
The life of a nation founded upon the dignity and honor of the individual, upon his right to a free and full opportunity to grow and to be useful to his fellow men . . .

This is the life for which our men have fought and bled . . .

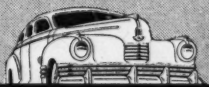
This is the life they must find when they come back with peace—the peace that lies there, ahead, beyond the horizon.



The men and women of the Propeller Division of Nash-Kelvinator Corporation have been awarded, and proudly fly and wear, the famous Army-Navy, "E" for High Achievement in War Production.



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NASH

Division of Nash-Kelvinator Corporation

Kenosha • Milwaukee • DETROIT • Grand Rapids • Lansing

Low Down on Synthetic

(Continued from page 62)

free from defects in material and workmanship, and to give service consistent with the type of material used. Satisfactory service for the life of the tire was the broad interpretation of pre-war guarantees, which were flexible enough to cover a wide-variety of tire failures, whether due to inherent weaknesses or to operating conditions.

Passenger-car tubes are now being made of GR-S. The industry also

is switching over from natural rubber to GR-S for small commercial-vehicle tubes. The GR-S tubes are somewhat heavier than natural-rubber tubes. They are proving reasonably satisfactory, but they exhibit the same deficiency as GR-S tires, notably a tendency to tear more easily and a consequent need for more care in mounting and repairing them. GR-S tubes will not stand flexing under high stress, which makes them subject to base splitting if the tube is caught under a bead and undergoes undue strain or stress at any point during the mounting operation.

Service experts of one company recommend the following steps in mounting synthetic rubber tubes in passenger car tires: Inflate the tube about three-fourths full, or to a point where it starts to round out. Then insert the tube in the casing. When the tube is inside the tire, paint both tire beads and the base of the tube with a thin soap and water solution made from high-grade soap flakes. This lubrication prevents localized strains. Mount the tire on the rim and adjust to centered position so that the beads are out of the rim well. Inflate the tube to seat the tire beads firmly against the rim flanges. Then remove the valve core, deflate the tube completely, replace the valve core and re-inflate to the operating pressure. If these instructions are not followed carefully, tears may develop inside the tube, showing up as pin pricks on the outside surface. Instructions for installation of GR-S tubes will be contained in each new tube box.

Preservation of tire carcasses is regarded as a very important point in the government's tire conservation program. To that end, better grade retreading material is being made available. The war emergency retreads, a temporary stopgap containing up to 80 per cent reclaimed rubber and no natural rubber, were discontinued Oct. 1. These will be superseded by two grades of retreads containing synthetic rubber. Grade A, for recapping truck and taxi tires, will contain a minimum of 70 per cent GR-S and the rest compounding ingredients. This retread material will have a red stripe on the edge identifying it as GR-S. The Grade C retread will contain 45 to 50 per cent GR-S, 10 to 15 per cent reclaimed rubber and the rest filled. Both compare favorably with natural rubber recaps under normal operating conditions, but the GR-S still is likely to generate heat and to crack and chip at excessive speed or with an overload. The Office of Rubber Director hopes to make material for 2,500,000 retreads available monthly.

Extreme care should be taken in repairing GR-S tires and tubes, as they are more likely to tear, scratch or chip than natural rubber.

In patching a GR-S tire, the injury should first be skived out so all the damaged cords and tread are removed. A tire of six plies or less should be beveled from one side only, either inside or outside, depending upon which will result in the smaller opening. A tire of eight or more plies should be beveled from both inside and outside if the injury is through the tire, making the bevels meet at the top or last ply of the tire. Buffing should remove all lining paint, but care should be taken to buff with the cords and not across them so that no additional cords are broken or torn from the surrounding

(Continued on page 66)

CONTINENTAL RUBBER WORKS



"THE HAND OF THE SPECIALIST"

The Hand of the Specialist is Prepared for the 1944 Conversion to Synthetics



As the year comes to a close, Continental chemists are busy converting compounds from crude rubber to synthetics in accordance with Government regulations.

This task is less difficult for Continental because it worked with synthetics for many years before the war and is well prepared to meet the situation by actual experience with all types of synthetics.

The diminishing supply of crude has made further curtailment obligatory and it is now clear that little or no crude will be available in the year ahead. But despite that fact, Continental's high standard of quality will be maintained at any cost. As a result of the industry's conversion from crude to synthetics, such a wealth of experience will be gained that the products of tomorrow will be destined to perform duties and render service beyond anything previously conceived in industrial rubber goods.



CONTINENTAL RUBBER WORKS
makers of the VITALIC

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“Today...

car owners ask for **MARFAK**”



Car owners read about Marfak in magazine ads, hear about it on the popular Texaco

Star Theatre radio show or from their friends. They're interested because they know now that only the best of lubrication can keep their cars in top running condition for the duration... and for some time thereafter!

That's why car owners are asking for Marfak, the special Texaco chassis lubricant that sticks to its job.

Dealers everywhere are boosting their lube profits with Marfak. You can do it too. Ask your Texaco man to show you how easily and simply Marfak can be demonstrated and sold! You'll get more cars on the lift and keep 'em coming!

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Talk to your Texaco man today — telephone the nearest of 2300 wholesale supply points — or write to The Texas Company, 135 East 42nd Street, New York 17, N. Y.



YOU CAN MAKE MORE

MONEY WITH MARFAK

Low Down on Synthetic

(Continued from page 64)

rubber by the rotation of the buffing brush. This is especially important in tires made of rayon, which is chemically treated before being impregnated with rubber. If too much of the chemical coating is removed from the cord, the repair cushion will not adhere satisfactorily to the bare rayon.

Two coats of vulcanizing cement are applied over the entire buffed area. All the carcass skives are filled

with cushion gum, making certain that all trapped air is removed. Then the pre-built patch is put in place, making sure that all cord ends are imbedded in cushion gum at least 1/32 in. thick. In building up a patch in the tire from raw cord fabric, ply by ply, it is general practice to use two less plies in the repair than the number of injured. This prevents too thick a patch and lessens the likelihood of flexing that will cause heat. This rule applies to tires of six plies and more. In repairing small injuries under 2 in. in truck tires, the inside repair should contain 50 to 60 per



"Let's put tomatoes in this can and we can charge ration points for it."

Miles and Miles OF PIPE LINE-TOO!



Army pipe lines help "pass the ammunition" to front battle lines in this war...delivering vital oil, gas and water to keep 'em rolling and keep 'em flying!

Here at AP, we're glad to be helping...with much of our production geared to the making of portable pipe lines such as these for our armed forces.

At the same time, AP and Subsidiary are producing more mufflers than ever before for civilian replacement needs. But if we can't supply your requirements today "as usual"...you'll know that we're working first for Victory!

The AP Parts Corporation, Toledo, Ohio.

MILEAGE GETTING MUFFLERS

CUT DOWN B.P.
(BACK PRESSURE)

with

AP

Usner Chosen President

The Ross Gear and Tool Co., Lafayette, Ind., has announced the election of Edward L. Usner as president, succeeding Eugene Gruenewald, whose death occurred Oct. 1.

Usner was originally associated with the Ross Gear and Tool Co. from early in 1915 to late in 1919, serving during part of that time as assistant manager. After an interim of 18 years, he returned to the company in 1937 as factory manager, was elected a director in 1939, and vice-president in 1941. A considerable portion of the time when he was absent from the Ross Company was spent as a management consultant, serving a number of companies in all phases of manufacturing activity.

The directors also elected S. L. Bradley vice-president in charge of sales. Bradley has been associated with the sales department since 1917 and has been sales manager since 1934.

U. S. Rubber Pays \$2

The board of directors of United States Rubber Co. has declared a dividend of \$2 a share on the 8 per cent non-cumulative first preferred stock. This makes a total of \$8 declared on the preferred this year.

There was also declared at the same meeting a dividend of 50 cents a share on the common stock. This makes a total of \$1.00 declared on the common this year.

Both dividends are payable Dec. 17, 1943, to stockholders of record Dec. 3.

THIS JACK GREW UP THE HARD WAY

Sixteen years of slam-banging around on shop floors, in service pits, in tool boxes — of lifting *overloads*, of being dropped on and being dropped! All the abuse that jacks shouldn't get, *but do*, have been given to Blackhawks. *And they took it!*

That's how Blackhawk Jacks came to be "tops." The boys who use 'em told us what *they* thought would make Blackhawk better. We listened to their suggestions — and used 'em.

There are things about building jacks that just seem to have to be learned the *hard way*. *That takes time!*

And it takes a *willingness* to listen and to learn and to *do* things better.

Blackhawk Jacks grew up the *hard way*. They're Service Proved — and Service Improved — by sixteen years of use and abuse. They can take it!

*When you need a jack—buy the best
—buy Blackhawk!*

BLACKHAWK MFG. COMPANY
Dept. J6123, Milwaukee, Wis.



This seal is found ONLY on
BLACKHAWK JACKS—your assurance
of a wise and safe investment.

BLACKHAWK

DECEMBER, 1943

When writing to advertisers please mention Motor Age

Cars in Use Equal 1939

By MARCUS AINSWORTH

It is a tribute to the durability of American-built motor vehicles and the efficiency of automotive maintenance men that, almost two years after motor vehicle production ceased, only 1,752,578 fewer passenger cars and 176,819 fewer trucks and buses were registered in 1943 than in 1942. Statisticians both within and without the automotive industry had predicted dire consequences to our private

transportation system as a result of the cessation of motor vehicle production in the early months of 1942. They predicted a drop during 1942 of from 6 to 10 per cent in motor vehicle registrations and a further decline in 1943 of from 10 per cent or more. However, registrations during 1942 showed a very moderate decline of only 4.6 per cent and the indications are that 1943 will only be 6.0 per

cent under the registrations of 1942. These facts have been brought to light as a result of the annual forecast of total motor vehicle registrations conducted by MOTOR AGE.

During 1943 25,674,665 passenger cars will be registered, as compared with 27,427,243 during 1942, a decline of 1,752,578 units or 6.5 per cent. Trucks and buses combined indicate a very slight decline of 3.7 per cent, with 4,553,198 units registered in 1943, against 4,730,017 in the preceding year. All motor vehicle registrations for 1943 will amount to 30,227,863 as compared with 32,157,260 during 1942, a decrease of 1,929,397 units, or 6.0 per cent.

In the gas-starved 12 Northeastern states and the District of Columbia the loss in passenger-car registrations will amount to 48 per cent of the loss for the country as a whole. The decline in units will be 840,133 passenger cars in the Northeastern area and 912,445 in the remaining 36 states.

Not all the decrease of 1,752,578 passenger cars can be attributed to scrap alone. Authoritative sources indicate that approximately 900,000 passenger cars will be brought into junk yards this year, compared with slightly over 2,000,000 during 1942 and a normal scrapage of about 2,200,000 passenger cars. Many others have been stored for the duration.


In view of the essential nature of trucks and buses, it is not surprising that these vehicles will show a decline of 3.7 per cent, as against the passenger car decline of 6.5 per cent. Only 176,819 trucks and buses will go out of service this year.

Surprisingly enough, total motor vehicle registrations at the end of 1943 will be approximately the same as at the end of 1939, when no shortage of cars and trucks was noticeable. However, vehicles on the road today are older than at the end of 1939. At that time, 5,400,000 vehicles were less than two years old. Today there are practically no cars or trucks less than two years old, even though some few might have gone into service only this year. On July 1, 1941, the age of cars in use on a percentage basis was as follows:

11.7 per cent	were less than 1 year old
11.3 per cent	were from 1 to 2 years old
8.7 per cent	were from 2 to 3 years old
6.3 per cent	were from 3 to 4 years old
12.6 per cent	were from 4 to 5 years old
11.5 per cent	were from 5 to 6 years old
7.8 per cent	were from 6 to 7 years old
5.8 per cent	were from 7 to 8 years old
4.1 per cent	were from 8 to 9 years old
2.7 per cent	were from 9 to 10 years old
17.5 per cent	were 10 and over years old

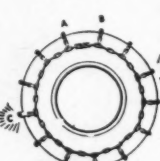
All these cars, if still in use, are now at least two years older. If we assume that the percentage of distribution by age remains approximately the same today, and that may be a slight stretching of statistical privilege, instead of 17.5 per cent of our cars being 10 or more years old the proportion would now be 24.3 per cent (Continued on page 70)

"REPAIR CHAINS PROMPTLY!"



Worn or broken cross chains throw a whole chain out of balance, greatly increasing wear. Replacing broken cross chains with new ones may also create bad balance because the new cross chain weighs more than the old ones. Ask your Jobber for the new Pyrene wall chart. It gives simplified instructions on how to install, use, and repair tire chains to get the proper wear and protection.

HERE ARE SOME SIMPLE RULES TO FOLLOW IN REPAIRING CHAINS



MAKE sure that the first and second cross chains that need replacing (usually A and B) are not replaced with new cross chains, but worn ones taken from opposite sides of the wheel (C and D). The vacancies (C and D) should then be filled with new cross chains as shown.




DON'T install two new cross chains in successive positions (A and B). It is better to install one new chain (A) and remove a worn chain (C) from the opposite side of the wheel for a replacement in the succeeding position (B). Install a new one where the worn one (C) was removed.



WHEN half the original cross chains in a set have been replaced, it is better to replace all well-worn cross chains with new ones. The cross chains with new ones may be used for least worn chains or for rebuilding other sets in similar condition of wear.

BE SURE THEY'RE...

Pyrene Manufacturing Company
NEWARK • NEW JERSEY
ATLANTA • KANSAS CITY • CHICAGO • SAN FRANCISCO



**No Brake Job is Too
Tough for**

CoMaX

The Extra-Life Brake Lining



Good, dependable brakes are essential to conserve the period of usefulness of vehicles which must last for the "duration."

There is no job too tough for CoMaX, and you can perform a real service towards keeping automotive transportation rolling safely—by recommending that old, wornout linings be replaced with CoMaX Brake Lining. CoMaX is the finest in molded brake lining. It is unsurpassed for quick, safe, smooth stops.

CoMaX is the extra-life brake lining. This means thousands of extra miles before replacement is necessary—and less frequent replacements mean more lining immediately available for war needs.

CoMaX has reinforced backing which permits deep seating of rivets, thus extending the period of safe usefulness.

Then, too, CoMaX Brake Lining is non-compressible, uniform in texture, easy on drums, and is age-proof. It is available in rolls, sets, blocks, and slabs. For details, consult your nearest Wagner jobber, or write us.

WAGNER

Automotive Products Include:

**LOCKHEED
HYDRAULIC BRAKE FLUID**

**LOCKHEED
HYDRAULIC BRAKE PARTS**

**CoMaX
BRAKE LINING**

**WAGNER
AIR BRAKES**

TACHOGRAPH



Wagner Electric Corporation

ESTABLISHED 1891

6498 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
AUTOMOTIVE AND ELECTRICAL PRODUCTS

For Victory—Buy U.S. War Bonds and Stamps

When writing to advertisers please mention Motor Age

B43-11

Wm. J. Menghini, Jobber, Elected NSPA President

William J. Menghini, automotive wholesaler of Springfield, Ill., has been elected president of the National Standard Parts Association, succeeding Walter C. Dodge, Jr. The new NSPA head, active in association affairs for a number of years, served during 1942 and 1943 as a vice president.

W. D. Kirkpatrick, Manley Manufacturing Division of the American Chain and Cable Co., has been advanced from the post of junior vice president to that of senior vice presi-

dent. Newly elected to the position of junior vice president and chairman of the Wholesalers' Board of Governors is Franklin C. Bradley, a wholesaler of New Haven, Conn.

The following five directors have been elected for three-year periods to replace those whose terms expired this year:

W. J. Barron, wholesaler, Barron Motor, Inc., Cedar Rapids, Ia.

C. R. Crowder, manufacturer, Van Norman Co., Springfield, Mass.

William E. Imhoff, manufacturer, McCord Radiator and Manufacturing Co., Detroit, Mich.

Frank McKenzie, wholesaler, Auto-



William J. Menghini

motive Supply Co., Bluefield, W. Va.
Don H. Teetor, manufacturer, The Perfect Circle Co., Hagerstown, Ind.

B. G. Close, King Quality Products Co., St. Louis, Mo., was elected for a one-year term to fill the vacancy created by the death of H. W. Knapp.

R. L. Sommerville has been elected by the manufacturer directors of NSPA to serve as chairman of the Manufacturers' Board of Governors.

Inauguration of the new officers and directors was a feature of the concluding session of the NSPA Management Planning Conference in Chicago, Nov. 10.



Write for this...

New literature on Automotive bushings and bearings produced from Johnson LEDALOYL . . . the newest development in powder metallurgy.

Johnson LEDALOYL is manufactured by a new and unusually different process. We start with *pre-cast* bearing bronze. By so doing we are able to control the structure of the bearing thus providing uniform strength and uniform, dependable lubrication. Parts manufactured from LEDALOYL hold up to 35% oil by volume.

Excellent delivery is offered on such items as Generator and Starter, Water Pump, Spindle Bolt, Clutch Pilot, Clutch Finger and Steering Sector Bushings. Write for this new literature . . . TODAY.

JOHNSON **BRONZE**
SLEEVE BEARING HEADQUARTERS
455 S. MILL STREET NEW CASTLE, PA.

Cars in Use Equal 1939

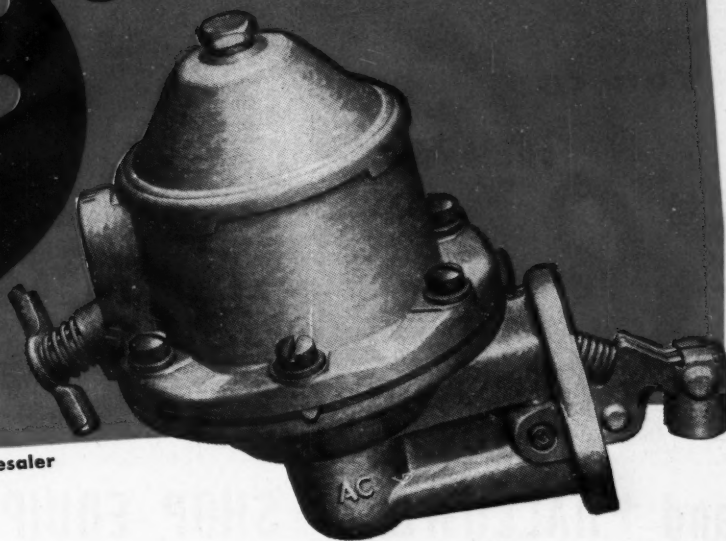
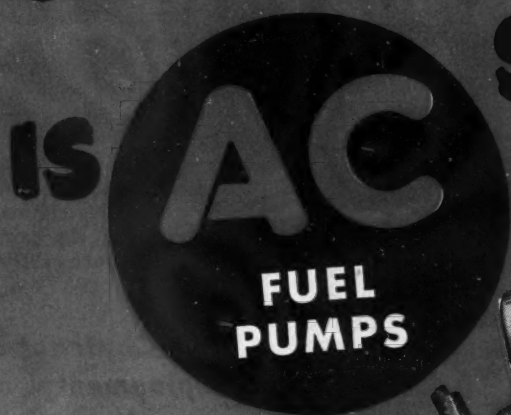
(Continued from page 68)

cent, or about 5,240,000 passenger cars. In pre-war days, the average age of passenger cars in use was 4 to 5 years. By using the percentage table shown above, but adding two years of age to each group in it, we arrive at the possibly disputable estimate that, by the end of this year, only 23 per cent of the cars registered, or 5,905,000, are less than four to five years old and the remaining 19,770,000 are 5 or more years old. Thus we can see that the great majority of the cars registered now have lived way beyond their normal life expectancy. However, with a continuance of resourcefulness on the part of automotive maintenance men throughout the country, future scrap-page should be kept at what, under existing conditions, may be considered a reasonable rate.

Borg-Warner Dividend

Directors of Borg-Warner Corp. have declared a dividend of 40 cents per share on the common stock of the corporation, payable Jan. 1, 1944.

THE Safest FUEL PUMP SERVICE SERVICE



AC Fuel Pump Products Available from Your AC Wholesaler

You can give *absolutely safe* service on fuel pumps in two ways:

1. Install complete pumps, either new or rebuilt, made by AC—builder of the original equipment pumps.
2. Make emergency repairs with AC Diaphragm Kits or AC Parts Kits.

Use as original equipment is very important in maintaining the quality of AC pumps. Car and truck engineers are exacting in their demands. The pumps they approve *must* meet the requirements of their engines.

So, when you supply AC pumps and parts, you're giving your customer the *safest* replacement and repair products you can get. They assure *him* of the same pump reliability and performance he bought with his new vehicle. They assure *you* that your reputation will be protected.

WHAT THE AC TRADE-MARK STANDS FOR

- Careful control of pressure and flow—assuring correct fuel supply.
- Accurate hardening and precision machining of parts essential to long life.
- Accurate control of spring tensions and temper.
- 4-layer, patented-impregnation diaphragms of special airplane cloth.
- High, and controlled, pin hardness.
- Carefully finished rocker arm pads, located to center on cam.
- Split-hair rocker arm clearance and control of pad hardness.
- Uniform pull rod hardness at pin holes.

SPECIAL HELP FOR YOU Trained field service men, and the AC Shop Manuals, are available to help you give better service, and conserve AC products. If the AC man in your area hasn't brought your manuals yet, send in the coupon below.

Field Service Department, AC Spark Plug Division, G. M. Corp.
910 Union Industrial Building, Flint, 3, Michigan

Gentlemen: Please send at once, no charge, the AC Shop

Manuals checked:

- | | |
|--|--|
| <input type="checkbox"/> How to Service Spark Plugs | <input type="checkbox"/> HOW TO SERVICE FUEL PUMPS |
| <input type="checkbox"/> How to Service Spark Plug Cleaner | <input type="checkbox"/> How to Service Air Cleaners |
| <input type="checkbox"/> How to Service Oil Filters | <input type="checkbox"/> How to Service Speedometers |
| <input type="checkbox"/> How to Service Ammeters and other Instruments | |

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MA-12

**WAR BONDS
YOUR BEST
INVESTMENT**

MAIL THE
COUPON

Legally Speaking

A lawyer's interpretation of federal and local court decisions of interest to repairmen, presented each month

By C. R. ROSENBERG, JR.

Conveyance to Wife

Eight days after a business house sued a debtor, the latter transferred the real estate which he owned to his wife. It was alleged that she was to

assume payment of a mortgage held by a bank and, further, that the husband was indebted to her for an amount far in excess of the value of the real estate.

"The circumstances surrounding

the conveyance of the property to the wife," said the Kentucky court, "and the nature of her claims against her husband are such that we have no hesitancy in saying that it became incumbent upon her to support the conveyance. This she has failed to do."

"Supporting the conveyance" in such a case means to satisfy the court that the transfer was legitimately made for a valid and fair consideration. In this particular case, the court made an order providing that the real estate should be subject to the debts of the husband, regardless of the transfer.

Courts are most reluctant to disturb titles to real estate, but, when it appears that a conveyance of real estate has been made for the purpose or at least the effect of defeating creditors and preventing them from collecting their claims, such a conveyance will be set aside. (*Walker vs. Butt*, 143 *Southwestern Reporter*, second series, 841.)

Oral Contract of Employment

An alleged contract of employment was the basis of a recent lawsuit in Indiana. It was urged that an oral contract of employment for a term of five years had been entered into. "If we should concede," said the Appellate Court of Indiana, "that the evidence is sufficient to establish a contract to employ the plaintiff for a period of five years, such contract, not having been in writing, is a contract which cannot be performed within one year and is, therefore, within the statute of frauds."

The statute of frauds is a law, effective in all states, which provides, among other things, that a contract which cannot possibly be performed within one year is unenforceable unless in writing. Even if an oral contract of the kind could be proved by a dozen witnesses, it would do no good, for such a contract is simply "out" unless it has been put into writing. (*Montgomery vs. Guignet*, 45 *Northeastern Reporter*, second series, 337).

Competition by Former Employees

If one or more of a repairman's employees quit and go into business in competition with him, does their former employer have any protection against their soliciting his customers with whom they became acquainted while working for him?

In a recent Illinois case of the kind the former employees did not take any lists of their former employer's customers, but solicited those whom they knew and whose names they remembered. In making their solicitation, they made no fraudulent representation.

(Continued on page 74)



and "HALLOWELL" SHOP EQUIPMENT WILL HELP YOU "DO IT RIGHT"

"Hallowell" Work-Benches of steel, designed by specialists having a thorough knowledge and understanding of all shop needs and problems, are made in such a variety of combinations—over 1300!—that they can be readily adapted to handle any type of job. There is even a special type with casters on two legs and wheel-barrow handles that can be moved from job to job.



FIG. 928
HALLOWELL
WORK-BENCH
with top of smooth laminated wood. Pat'd and Pats. Pending.
Drawer is extra.

"Hallowell" Work-Benches are easy to install, too, because they are so sturdily constructed that they stand firm and rigid without bolting to the floor. Get as many as you need now—while deliveries are good.

For use where the installation of steel shop equipment is war-restricted, "Hallowell" Work-Benches are available in wood "for the duration".

Fully illustrated bulletins gladly sent upon request.

OVER 40 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 561, BRANCHES: BOSTON. DETROIT. INDIANAPOLIS. CHICAGO. ST. LOUIS. SAN FRANCISCO

fast Coast-to-Coast Factory Service

HELPS KEEP YOUR BLACK & DECKER TOOLS ON THE JOB



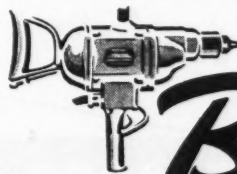
**No Portable Electric Tool is any better than the service facilities behind it!
And above are typical comments from both war production plants and automotive service men!**

Here is one more reason why—for every type of repair, maintenance and production work—far more Black & Decker Portable Electric Tools are used than any other make. Only on Black & Decker Tools is *Factory Service* so close at hand *wherever you are*—within 24-hour reach of anywhere in the U. S. A. Those 26 dots on the map are Black & Decker Factory Service Branches—where factory-trained men give you fast, expert service on repairs or replacement parts for Black & Decker Electric Tools.

Today automotive shops can get Black & Decker Tools only for highly essential war

work. But you *can* get Factory Service quickly—to keep your present Black & Decker Tools on the job! You *can* get many parts and attachments that help you do more and better work with your Black & Decker Drills, Sanders and Valve Reconditioning Equipment.

What's more: If you are repairing cars, buses, trucks or tractors which are essential to the war effort, your shop equipment may be classed as war equipment and you may be able to get new tools if you need them. Consult your Black & Decker Distributor. The Black & Decker Mfg., Co., 727 Pennsylvania Ave., Towson-4, Md.



LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

Legally Speaking

(Continued from page 72)

tions about either their old employer or themselves.

"We have reached the conclusion," said the Illinois court, "that in the absence of an express contract the court should not prevent an employee, after his employment is ended, from soliciting business from the customers of his former employer where no list of names was taken and no fraud committed."

That clause, "in the absence of an express contract," is a hint to repair-

men and other employers that they may protect themselves by requiring employees to agree, as part of their contract of employment, that they will not compete with the employer after their employment is ended.

"The use of trade or business secrets gained through employment," the court pointed out, "may be properly made the subject of restrictive agreements. In this class fall agreements not to use lists of customers and not to entice old customers away by any form of solicitation."

A common feature of such restrictive employment contracts is an agreement by the employee that he will not

compete with the employer in any way within a designated area or within a specified period of time after the end of his employment. The area and the time should be such as are reasonable necessary for the employer's protection. (*Professional Service vs. Johnson*, 45 *Northeastern Reporter*, second series, 191).

When Employee Injures Customer

When a repairman's employee injures a customer or other person, damages another person's property, or perpetrates a fraud on someone, is the repairman who employs him legally and financially liable? The courts ordinarily say that an employer is liable for the wrongful acts of the employee committed within the scope of his employment.

Recently a Kentucky court explained what is meant by "wrongful acts committed within the scope of the employment."

"The test," said the court, "as to whether or not the offending employee has committed an act for which his private employer will be rendered liable would seem to be whether (1) the act is of the kind the offender is employed to perform; (2) it occurs substantially within the authorized time and space limits of the employment and (3) the offender is actuated, at least in part, by a purpose to serve the employer. The question is one of agency. The result is determined by the answer to the further questions, whose work was the employee doing, and under whose control was he doing it?"

Some courts have said that, even if the employee directly disobeys the employer's specific instructions when he commits the wrongful act, the employer is nevertheless liable for the injury or damage done if the act was "within the scope of the employment." The idea is that it is up to the employer to see to it that his own instructions are carried out. (*Fournier v. Churchill-Downs, Inc.* 166 *Southwestern Reporter*, second series, 38).

Sale or Purchase Of Building

A repairman negotiating the sale of his present business building or the purchase of another should not "count on" the sale or purchase unless or until the other party has signed a written agreement.

A contract to buy or sell real estate of any kind simply cannot be enforced unless it is in writing and signed by the proper party.

"It is elementary that contracts for the sale of real estate must be in writing," remarked the Supreme Court of Michigan in a recent case. (*Weinburg vs. Saier*, 6 *Northwestern Reporter*, second series, 921).

Buy U. S. WAR BONDS



COMPRESSED AIR

A Modern Genie WHO WORKS FOR VICTORY!

COMPRESSED air speeds maintenance work to keep trucks and cars rolling! It's the modern flexible tool that can perform miracles of labor saving in every busy shop if used in all its powerful and convenient adaptations. Use your Wayne Air Compressors more ways to solve the man-power shortage. We'll help you "Keep 'em pumping!" Ask for Wayne Service when you need it. Wayne Compressors are still available under Government regulations. Write us.

THE WAYNE PUMP CO.
FORT WAYNE 4, INDIANA

Wayne AIR COMPRESSORS

WHAT EVERY DODGE DEALER KNOWS

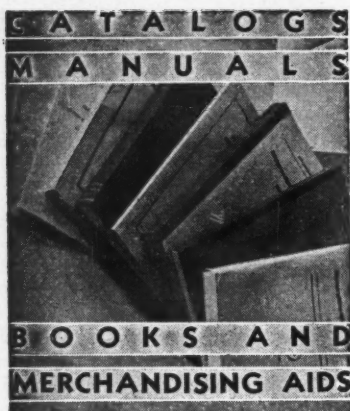
Every Dodge dealer knows that, through thick and thin, he has a factory whose policies he can depend upon, — and a line of cars and trucks that tap the richest possible sales and service market in several directions at the same time. ¶ He knows that there's not

another dealership just like it in the business. ¶ These things are being demonstrated just as clearly today as in times of peace. They are strongly confirmed by the close study now being given the Dodge franchise by far-sighted dealers interested in *maximum* opportunity.



DODGE . PLYMOUTH . DODGE Job-Rated TRUCKS

DODGE—DIVISION OF CHRYSLER CORPORATION, 7900 JOS. CAMPAU, DETROIT, MICH.



A new wrench catalog, especially designed for busy wartime buyers, has been issued by the Blackhawk Mfg. Co.

The catalog recognizes many of the emergency conditions existing in the field and is constructed to be of assistance beyond the mere listing of items.

A "Dictionary of Popular Wrench Terms" is included as "an aid to the thousands who, during the war, are buying and using wrenches for the first time." Another section illustrates "how proper selection of wrenches brings extra speed, safety and utility" to the job.

By omitting wrenches "suspended

for the duration," the book aims to eliminate delays caused by orders for items no longer available. An accompanying price schedule carries a complete table of "suggested substitutions." The catalog indicates that a complete basic range in socket, box-type and open-end wrenches has been retained for wartime service.

The catalog, No. 243, is available from Blackhawk distributors or can be had by writing Blackhawk Mfg. Co., Milwaukee 1, Wis.

* * *

Water in the radiator is as important as gas in the tank to keep the nation's motor cars, trucks, and buses rolling. This is the message of a new booklet, "Take Care of Your Cooling System," just issued by E. I. du Pont de Nemours & Co., Wilmington, Del.

Prepared by the Zerone-Zerex Division, the booklet points out that "the life of your cooling system is the life of your car." It tells how the cooling system works, how to prevent troubles, and the value and economy of regular service and attention to the system.

Discussing good anti-freeze compounds, the bulletin points out that an understanding of the dangers of using salt solutions which corrode copper and rust iron is important.

* * *

"Modern Oakite Cleaning Methods" is the title of a 36-page booklet just released. Of timely interest to car dealers, garage and service station operators and others responsible for "keeping 'em rolling," this fact-filled booklet contains helpful hints and suggestions for effectively handling over 21 commonly recurring cleaning and related jobs vital to the success of any maintenance program. Described are special techniques for cleaning generator housings, transmission parts, shock absorbers, carburetors, fuel pumps; reconditioning clogged radiators and cooling systems; steam cleaning motors; axles, chassis and undergear; washing cars and trucks; cleaning concrete and cement garage floors; and many other diversified types of work. Copies of the booklet are available free on request. Write to Oakite Products, Inc., 24C Thames St., New York 6, N. Y.

To instruct users of welding and cutting equipment in reducing potential fire losses, the International Acetylene Association has prepared a convenient, 16-page, pocket-size booklet entitled "Preventing Welding and Cutting Fires."

Copies of this booklet may be obtained in reasonable quantities without charge directly from the International Acetylene Association, 30 East 42nd St., New York 17, N. Y., or from any manufacturer of oxygen, acetylene, carbide, or welding and cutting equipment.



It's DEALER'S CHOICE with an Ace in the Hole!

Today when it behooves every wise automotive Service Operator to play his business cards close to his vest, it is doubly reassuring to know that in his bid for profits, he holds an *Ace in the Hole* . . . McAleer's complete line of Automotive Finishing Materials!

There was a time when selling waxes, polishes, cleaners and other preventive maintenance materials was considered merely a side line in the service picture. But, two years of war have changed all of that. Few automotive service businesses have remained unaffected—yours is probably no exception. Yet, there is this about it—"we're just two years nearer the end of the war" and that's what counts. After going this far, the remainder of the trip will have to be pretty tough to knock off service operators who have come to realize the true concept of what it means to help keep America's wartime automotive transportation rolling—it's a bigger more vital responsibility than any peacetime service job.

McAleer will fight to continue its policy of serving you despite ever threatening shortages of certain raw materials, despite the fact that since Pearl Harbor we have been engaged almost wholly 100% in War Production.

So we are backing you NOW, helping you provide services to your customers, with our original quality line of Protective Maintenance Materials. These are the extra profit items you must tie into your car conservation activities if you expect to stay in business. Make your Ace in the Hole McAleer's Protective Finishing and Maintenance Materials.

McAleer **MANUFACTURING CO.**
Quality-Controlled Finishing Materials
ROCHESTER, MICHIGAN

Jack Models Fewer

(Continued from page 42)

model and size of transmission jack may be made.

Under order L-270, issued last April, manufacture of 4 and 10-ton shop jacks and transmission jacks is limited in any calendar quarter to 20 per cent of the corresponding 1941 quarter.

Grade A Camelback Priced

PRICE ceilings for Grade A camelback have been set by the OPA at levels somewhat above the prices for other grades. Grade A camelback is now available for use on passenger-car tires when the cars are employed as taxicabs and jitneys.

The ceiling for recapping a 6.00-16 tire with Grade A camelback, when the carcass is supplied by the customer, is \$7. This compares with \$6.70 for Grade C and \$6.50 for Grade F. If the carcass is supplied by the seller, \$3.50 may be added to the price of a recapped tire, making a total of \$10.50 for a 6.00-16 tire.

Recent Rulings

SOLDER. An amendment to order M-43 raises the limit on the amount of tin that may be used in some solders to 21 per cent, but automobile body solder is restricted to 3 per cent tin content, and the tin must be derived from secondary sources.

PREMIUM GAS. The gap between the octane number of regular gas and that of high-test gas has been narrowed by the recent PAW order reducing the octane number of premium gas from 78-80 to 76. Regular gas will continue to have an octane number of 72.

TIRE CERTIFICATES. Dealers who obtained new tires and tubes without ration certificates last May, when the OPA suspended rules temporarily to let dealers stock up, may retain the replenishment portions of the certificates, the OPA has announced. Dealers who already had turned in Part B of the certificates received for the tires and tubes will have these replenishment certificates returned to them.

GAS RATIONS. Effective Dec. 1, B-2 and C-2 coupons are good for 5 gal. each, compared with the 2-gal. value of B, C, B-1, and C-1 coupons. Fewer of the new coupons are being issued for a given period, so that no increase in the allotment of fuel is affected.

ANTI-FRICTION BEARINGS. The WPB denies that deliveries of anti-friction bearings have been frozen. Large bearing consumers have been requested to file Form WPB 3333, on

which it is necessary to obtain WPP approval of deliveries from December through May, 1944. The 30 manufacturers affected have been notified to file the form. Others are not required to file.

TRUCK TIRES. Certain types of trucks have been made eligible by the OPA to receive used passenger-car and truck tires of sizes smaller than 7.50-20 to replace tires no longer serviceable. Vehicles eligible are those engaged in delivering bakery goods, groceries, meats, fish, poultry, fresh fruits, vegetables, dairy products,

laundry and dry cleaning, drugs, medicines, and medical supplies. This action, says the OPA, may make it impossible for passenger cars to obtain used tires.

GAS MARK-UP. Gasoline retailers who have set their ceiling by adding three cents to the delivered costs of the fuel may now add three cents to their supplier's permissible ceiling, the OPA has ruled. This will permit an increase in the retail price where the supplier has not taken advantage of an upward adjustment in his ceiling.



**Here's how to get
EXTRA BEARING SERVICE**

EVERY BEARING YOU SAVE today is a bearing saved for VICTORY. For bearings are a VITAL defense need. They should be washed, dried and repacked at least every 5,000 miles to prevent abnormal wear. Keep them clean, that "Keeps 'em Rolling". To do a "factory job" of washing, drying and repacking bearings, service men are buying "Croft" equipment. It pays big dividends in time and labor and in longer bearing life. Ahlberg jobbers can supply you with this scientifically designed bearing service equipment.

Of course, when bearings must be replaced use Ahlberg Ground Ball Bearings. Scientifically re-processed and guaranteed to give new bearing performance. Ahlberg Ground Bearings have been a standard with large fleets and bus operators for thirty-four years.



Power washing removes every trace of old lubricant and dirt.



Compressed air blast blows the bearing perfectly clean and dry.



New lubricant forced into every part of the bearing.

Save all worn Ball Bearings for reprocessing the

AHLBERG

AGB Way BEARING COMPANY

Manufacturers of (CJB) Master Ball Bearings

★ 3028 WEST 47th STREET • CHICAGO, ILL. ★

Out West it's **PRECISION BEARINGS, INC.** *Los Angeles*

Additions to Gas Supply

(Continued from page 19)

ery of new pools amount to 5,740-000,000 barrels. We consumed during this period only 72 per cent as much oil as we discovered.

Even if our oil pools should run dry, says the NADA, there remains an almost unlimited supply from shale, natural gas and coal.

Compressor Models Cut

A SIMPLIFIED - practice recommendation promulgated by the National Bureau of Standards re-

duces the number of models of service-station air compressors from 347 to 12. The recommendation, covering automatic start and stop compressors of air-cooled construction, complete horizontal-tank mounted, electric-driven units, operating above 100 lb. per sq. in. and up to and including 200 lb. per sq. in., becomes effective Dec. 1.

Plan to By-Pass Dealers On Army Sales Protested

SALES of used Army trucks and passenger cars direct to the consumer have been protested by the Na-

tional Automobile Dealers' Association, and the Treasury Department Procurement Division, which is in charge of the sales, has promised the House Small Business Committee that no more such sales will be made until the committee has had a chance to study the matter further.

The vehicles include not only the "unserviceable" units, which as disclosed by MOTOR AGE last month are being sold on a competitive-bid basis at various Ordnance Service Command shops, but also thousands of used trucks and new or fairly new passenger cars which the Army has declared "surplus." At present the Procurement Division is believed to be holding 10,000 trucks and 6750 passenger cars.

News of the proposed sale of the new and used trucks and passenger cars direct to consumers was carefully withheld from dealers and, even when the NADA was tipped off, it was told frankly that dealers would not be given a chance to bid on the trucks.

The author of this little scheme to by-pass the dealer is generally thought to be Harry Hopkins, although it is easily understood why no one is making any to-do about gaining credit. The whole idea is manifestly unfair to the dealer, who has made tremendous wartime sacrifices, and is an open invitation to all manner of abuse. Congress can show that it still expresses the will of the people by promptly throttling any such attempt to ignore the rights of a businessman so vital to our economy as the automobile dealer.

New Boards Are Set Up, But It's Still Rationing

AS a result of increasing shortages, truck and bus tire rationing is to be taken away from local OPA boards. The latter, so far as commercial tires are concerned, will be replaced by central boards with members recruited from industry, at least in part, instead of public-spirited citizens who may or may not understand the requirements of highway transportation.

Changed also will be the practice of permitting almost any trade outlet or tire dealer to inspect tires to determine the necessity for replacement. A few inspection stations will be qualified. These will not sell tires.

Louisville, Ky., and St. Paul, Minn., were the trial horses for the present scheme and they seem to have worked out well. In Louisville, municipal safety-inspection stations did tire examining and in St. Paul tire manufacturers and dealers got together and designated a few commercial establishments as judges. The rationing board of industry representatives is already in action in Philadelphia and

(Continued on page 82)

Merry Christmas

HARRY BARRETT
President

FRED HEPPE
Vice Pres. & Trans.

DAN SMITHMAN

JACK CRAWFORD
Vice Pres. & Sales Mgr.

CLIFF GARSTANG
Asst. Sales Mgr.

ROSS EDWARDS
Asst. Mgr.

FRED HOLLOWAY
Asst. Mgr.

DICK HATTON
Asst. Mgr.

CLINT WILLIAMS
Asst. Mgr.

JACK WATSON
Asst. Mgr.

IKE GREGORY
Asst. Mgr.

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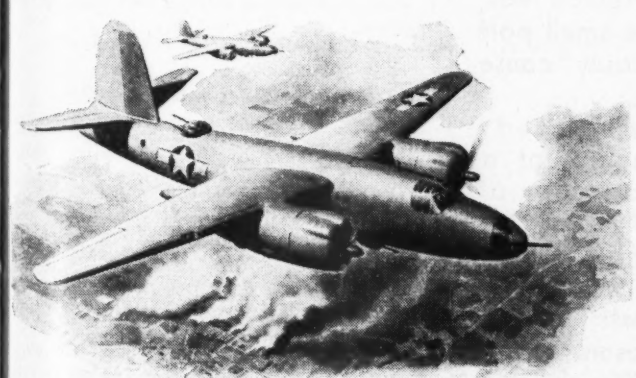
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De Soto

FAR AFIELD



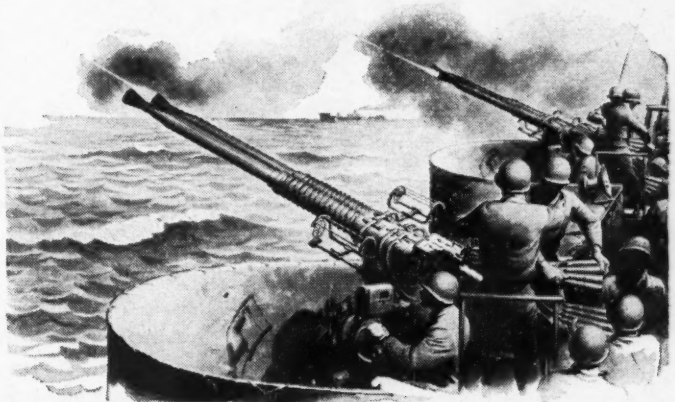
Bofors Cannon for Anti-Aircraft defense on land and sea contain vital parts from De Soto.



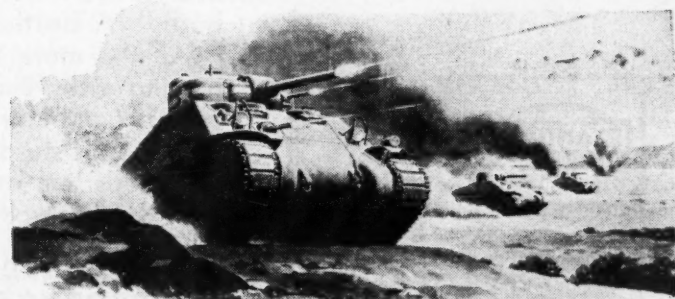
"Bodies for Bombers" have been produced by De Soto for many months.

THE big doors of De Soto plants now open day and night for the continuous passage of arms—to the remotest corners of the globe. The De Soto trademark of today is a kind of craftsmanship that increases the efficiency of guns, gives flight to the deadliest of bombers, provides fighting mobility for some of the toughest vehicles of war.

DE SOTO DIVISION OF CHRYSLER CORPORATION



In naval action throughout the world there's a touch of DeSoto too.



Tanks and fighting vehicles get many of their basic parts from De Soto shops and artisans.

DISPLAYED BY DE SOTO DEALERS

This De Soto sign means top-notch service and ample parts supply for the care and maintenance of De Soto products of peace.



War Bonds are Your Personal Investment in Victory

TUNE IN ON MAJOR BOWES, EVERY THURSDAY, 9:00 TO 9:30 P. M., EASTERN WAR TIME

New Boards Set Up

(Continued from page 80)

is being organized in New York. Sharp cuts in commercial tire allotments can be expected.

Sales of Surplus Goods Follow Familiar Pattern

TESTIMONY before the House Small Business Committee recently disclosed that several sales of surplus war material had already been made

to scrap and junk dealers without benefit of publicity. Sales were authorized by Procurement Regulation 7, but this was one of the points that swayed the committee when it recommended last month that Congress speedily enact legislation to control further sales of surplus war goods.

It was brought out at the hearings that the Army had cancelled more than 10,000 contracts up to that time, each cancellation leaving a stock of unneeded raw material and semi-finished products. As the committee pointed

out, disposal of these goods should be controlled now.

The committee recommended specifically that Congress create a central agency, supported by a definite declaration of policy, to protect business and the taxpayer from the danger of dumping perhaps \$50,000,000,000 of government owned surplus goods on the market indiscriminately.

Businessmen testifying before the committee were unanimous in insisting that business should have some representation on the central agency. This is a reasonable demand and it should not be abandoned until Congress has taken definite action.



Little Things that do A BIG JOB

LIKE the lost horseshoe nail, the failure of a small part in a car could easily cause great disaster.

Who knows what tragedy may lurk in the shadow of a spark coil that breaks down at a critical moment? A stalled truck. The shipment of War materiel that "missed the boat." A battle lost!

All the more reason for replacing with "Blue Streak," the coil of "Long-Life Peak Performance." This sturdy, dependable coil keeps 'em rolling. The coil for Wartime and for all time.



**STANDARD MOTOR
PRODUCTS, INC.**

37-32 Northern Blvd.

Long Island City, N. Y.

For "Long-Life Peak Performance" Use Blue Streak Ignition Parts

Moog Industries Formed

Hubert P. Moog, president of the St. Louis Spring Co. and the Moog Piston Ring Co., of St. Louis, Mo., announces the formation of Moog Industries, Inc., to bring the various products manufactured by these companies and their divisions and subsidiaries, using the trade name Moog, into one organization.

There is no change in ownership, management, or personnel, but, due to the increasing number of products now carrying the trade name "Moog," it was deemed advisable to simplify and amplify the sales and advertising efforts of the component companies under the one familiar corporate name.

The St. Louis Spring Co. has been manufacturing and merchandising Moog Electrically Heat-Treated Truck and Auto Springs for nearly a quarter of a century. The Moog Piston Ring Co. has become widely known through its line of Moog X-Plus Piston Rings. The Moog Coil Action Parts Co., with front-end spring suspension part replacements, has won wide acceptance during the past three years.

Takes Charge of Sales

W. F. Newbery has been appointed sales manager of the Industrial Division of Detrex Corp., Detroit, Mich., according to an announcement by W. W. Davidson, vice-president.

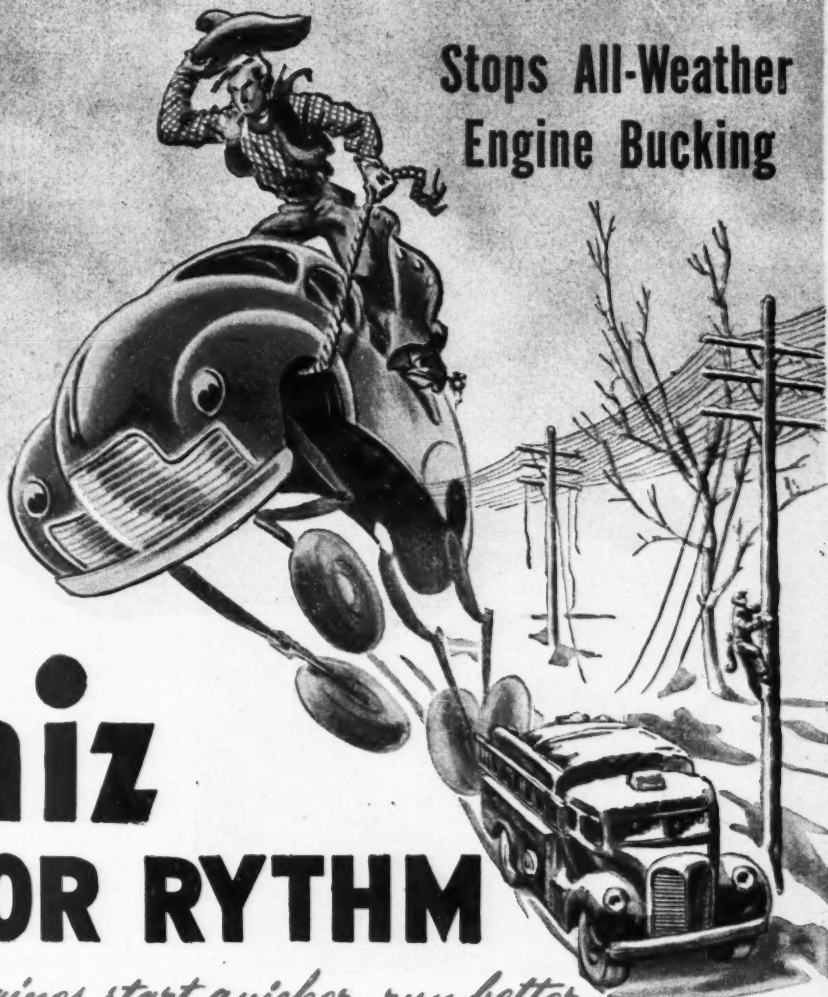
Newbery started with Detrex in 1934 as sales and service engineer in the Northeastern States, later serving as Eastern Region manager for several years. More recently he was South Central Region manager with headquarters at Dayton, Ohio.

Assumes Accounts Post

George E. Hammel has been appointed Studebaker's assistant national accounts director, in charge of the Midwestern Region, according to an announcement made by Charles H. Wondries, Director of the National Accounts Division of Studebaker.

Hammel will continue to maintain his office and staff in Chicago.

**Stops All-Weather
Engine Bucking**



Whiz MOTOR RYTHM

makes engines start quicker..run better

WHIZ MOTOR RYTHM is a chemical compound developed by Hollingshead. Its detergent action removes the deposits of carbon, sludge, and varnish that rob engines of power... *that can actually cause damage!*

When WHIZ MOTOR RYTHM is added regularly to gasoline and oil it keeps engines clean. Assures quicker, easier cold-weather starting, better engine performance. Frees sticking

valves and rings... stops bucking and ping due to carbon. MOTORRYTHM increases greatly the film strength of motor oils... stretches gasoline rations.

WHIZ MOTOR RYTHM is the fast-selling, repeat-sales product every motorist wants! Powerfully advertised. Complete, attractive displays and point-of-sales helps available. Order from your jobber today.



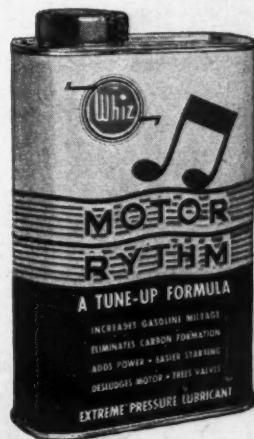
BUY MORE BONDS!

Hollingshead

LEADER IN MAINTENANCE CHEMICALS

Other popular WHIZ reconditioning chemicals:

VENUS POLISH • INSTANT SEALER • RADIATOR CLEANER • COMMANDO RUST PREVENTIVE • BRAKE FLUID • HO-ZOF DEGREASER.



Wins Army-Navy "E"

(Continued from page 21)

one of the leading Buick dealerships in the country. Its sales room and shop were roomy and modern, and employed an even 100 persons. Erwin H. Geiger and Samuel C. Dretzin, who had formed Surrey Motor in 1934 to take over a defunct dealership, refused at first to believe that the threat to their business was so serious as it seemed. They could not believe that the production of anything so vital to the war effort as

automobiles would be stopped altogether. As weeks past, it became evident that the WPB meant what it said and that new-car business was virtually a dead letter and also that service business, although it remained good, would not be able to carry the considerable overhead.

By July, 1942, Surrey was practically out of the automobile business. Key employes were given six months' salary and told to look for war jobs. Geiger and Dretzin were tempted to quit, but they had fought and worked too hard to establish the business to give up easily. Like many another

dealer they considered the possibility of getting into war work.

Following accepted practice at the time, they consulted local government agencies to see what products could possibly be produced in a dealer shop. But, unlike less determined men, they refused to be discouraged by the rebuffs of local officials.

Geiger and Dretzin went to Washington and straight to military procurement agencies. This was no undertaking for men who did not have something tangible to offer. Geiger and Dretzin did. The former had been president of a bronze specialty company before he entered the automobile business, and he knew production methods. Further, he knew some of the headaches that awaited the automobile dealer who might be tempted to invest heavily in tooling up for war production in the mere hope of getting war orders.

Persistence finally brought Geiger and Dretzin into contact with the Army's Corps of Engineers. At the time, the corps was looking for some one to bid on an order for erection equipment for a British-designed emergency bridge. The equipment was considerably varied, entailing metal fabrication as well as wood-working, and no one in this country had ever made it. Still it seemed to Geiger that the problem was one the Surrey shop could solve. Surrey Engineering Co. was organized to bid on the contract and won the award.

Then came the test. For three months, Geiger and Dretzin went into a huddle with engineers, draftsmen, sub-contractors. Space was available in the Surrey shop for only a certain number of operations, even if the service department were crowded into a corner, so the actual fabrication of component parts was sub-contracted. The Surrey shop undertook the pickling and painting of the metal parts and sub-assemblies, the assembly and painting of wooden parts, and the assembly of the various parts into the complete erection units. A great part of the production line was designed and built in the shop. Less than \$10,000 was spent for new equipment.

Since every step was a new venture, each problem had to be solved as it arose. And it was solved. At the end of three weeks, the production line was ready to move and sufficient workers had been recruited to move it. Instead of the 100 employees of pre-war days, the shop now employed 102, of which 60 per cent were former employees. The type of work dovetailed neatly with the experience of automobile mechanics.

So thoroughly was the production studied that the shop was able to suggest improvements in the product and these were accepted by the Army. On certain heavy rollers, which were among the units produced, no provision had been made for lubrication.

(Continued on page 86)



The Best Gift of All

WAR'S hardships ended! Normal conditions restored! Victory—a gift worth any price! You have been paying your share of that "price"—in advance. Paying it in jobs lost through the scarcity of replacement parts—and in many other ways.

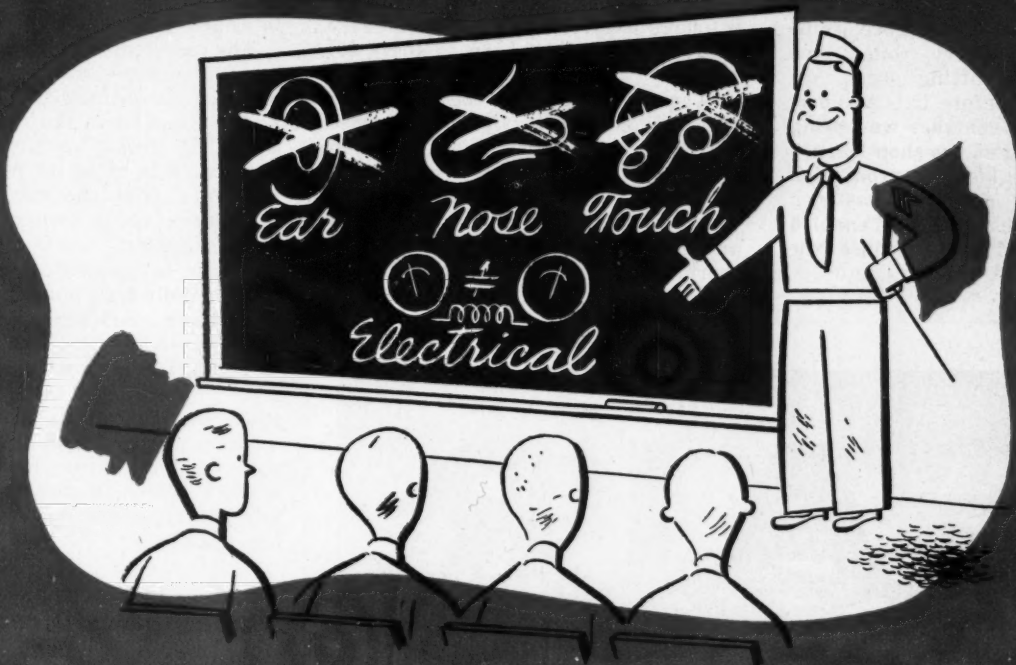
We regret that thousands of our old friends have been handicapped by our inability to serve them as in the past. We gave Government orders the Right-of-way—because the Right-of-way was the right way!

To our host of loyal customers we extend sincerest wishes for a prosperous New Year. We take this opportunity to thank them for their indulgence, which has enabled us to do our part in achieving an earlier Victory—the Best Gift of All.

HYGRADE PRODUCTS CO., INC.
35-35 Thirty-fifth Street
Long Island City, N. Y.



HYGRADE



UNCLE SAM PRACTICES WHAT WE PREACH

"Cut out the guesswork" — that's lesson number one for Uncle Sam's mechanics. The ear test . . . the nose test . . . the touch test — well, some shops may still use them, but they belong way back in the old days. They are a hit-or-miss way of shooting trouble — about as dependable as a stranger's advice on picking a horse.

The army takes the guesswork out of repair-work with Lanagan Fuel Analyzers . . . Generator Test Benches . . . Distribu-

tographs . . . Armature Testers . . . and other scientific Lanagan testing instruments. Rushed to the scene of the breakdown in mobile ordnance repair trucks, out-of-service time is cut to the minimum. Thousands of trained mechanics will come back after the war with this sound background.

And here at home, today, Lanagan testing equipment is helping short-handed shops do more dependable work, quicker. Write for catalog.

BONDS HELP KEEP 'EM ROLLING, TOO—BUY YOUR SHARE REGULARLY



LANAGAN AND HOKE

PHILADELPHIA 44, PA.

PRECISION AUTOMOTIVE TESTING EQUIPMENT

DECEMBER, 1943

When writing to advertisers please mention Motor Age

85

Wins Army-Navy "E"

(Continued from page 84)

Surrey suggested automotive-type grease fittings. Every roller now assembled has its fitting or fittings and is lubricated before it is shipped.

While the first contract was being rushed to completion, the shop learned several new wrinkles in production methods. These not only hastened completion of the work but enabled the shop voluntarily to reduce the price on subsequent orders. The order

now in the shop is the fifth, three of which were done for the Corps of Engineers, and two for Lend-Lease. In the year Surrey has been producing the erection equipment, with a government inspector on the job every hour, there has not been a single rejection.

War work has taken the play away from automobile service, but service still is important. Currently, the shop is doing 10 per cent more service work than at this time last year. Customers must make an appointment two and a half weeks in advance. Since there is no longer room in the shop

to store cars until they can be worked on, they are parked on the old used-car lot across the street, and customers are required to sign a waiver of any claim upon the shop for damage or theft of personal effects.

The used-car lot is available for storage because Surrey got out of the business as soon as the used cars it had on hand when the war came were sold. "I think," explains Dretzin, "that we'll be in better position to sell new cars after the war if we don't take advantage of owners in the present emergency."

Geiger, to whom Dretzin gives most of the credit for planning the production set-up, died some months before the Army-Navy "E" was awarded the firm. But every employee wears the lapel decoration with undisguised pride, and Dretzin as proudly as any.

He has every right to feel satisfied with the job his firm has done. It is more evidence of the courage, skill, and ability of the American Automobile dealer.

Named Sales Director

Carl R. Wipern has been appointed sales director for the McQuay-Norris Mfg. Co., succeeding Herbert W. Knapp, who died recently.

In addition to the appointment of Wipern, the company has divided the United States into three zones and has appointed P. F. Collier Eastern zone manager; Morrill Palmer, Middle zone manager, and E. H. Wipern, Western zone manager. Under these zone managers, district managers will operate, as in the past, and the sales force will work directly under the district managers.

Carl Wipern began his career with McQuay-Norris in 1918 in the St. Louis office and later joined the sales force, covering Nebraska and Iowa out of the Omaha branch office. In 1938 he became district sales manager of the Middle Western section.

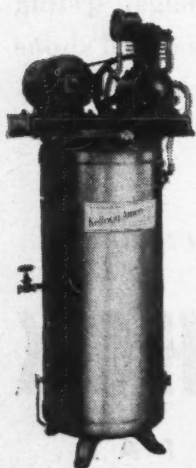


Carl R. Wipern



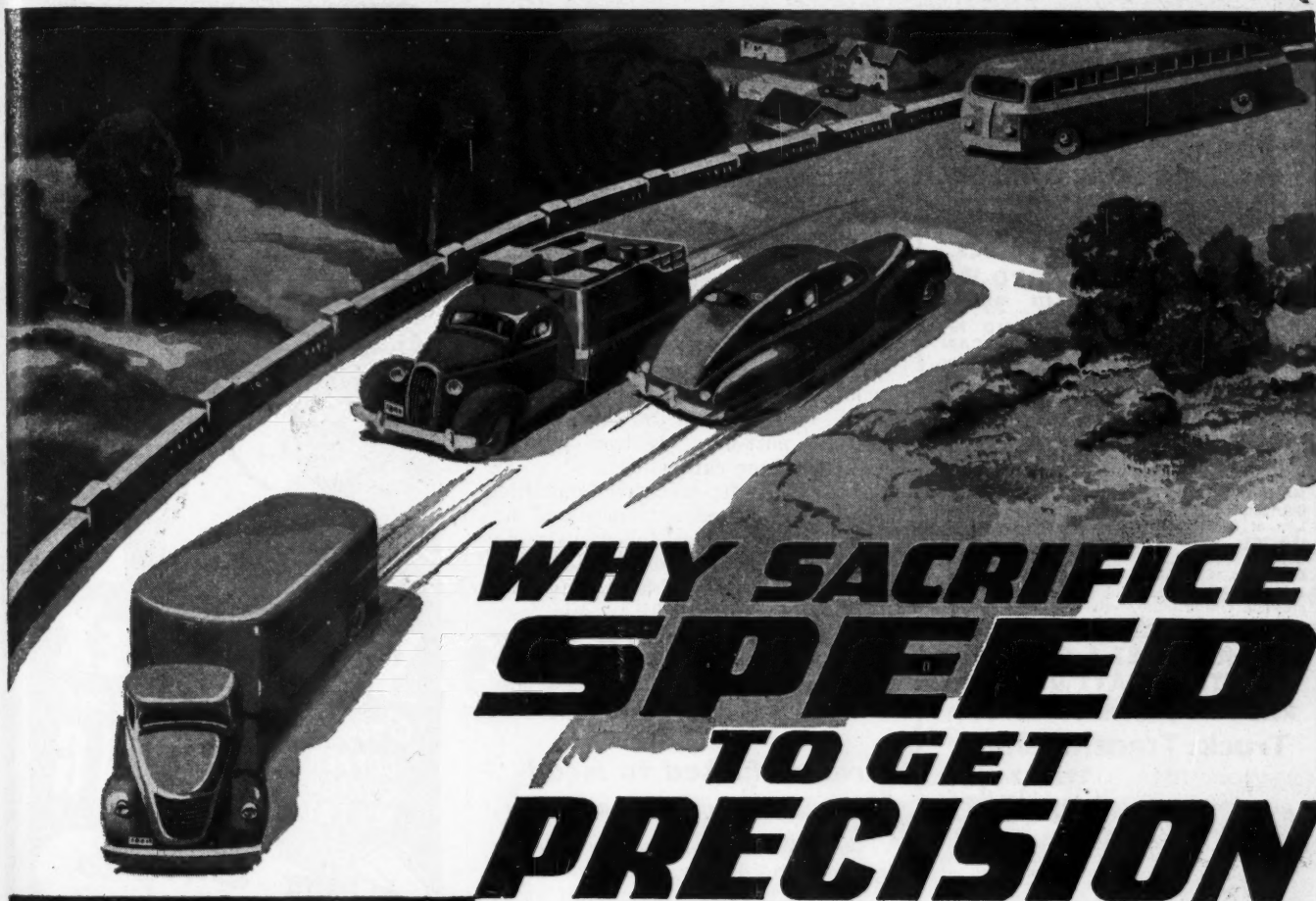
Whitecaps crashing aimlessly on the shore are evidence of ungoverned wind—and a waste of energy. Air, compressed and controlled, is an inexpensive faithful servant of mankind's needs. For constant pressure you'll want a Kellogg-American air compressor—built for durability, rubber-cushioned for silence, engineered for high efficiency and low current consumption. Available now only on priorities, but a money-making investment for you after the war.

ANOTHER
AMERICAN
Brake Shoe
COMPANY
PRODUCT

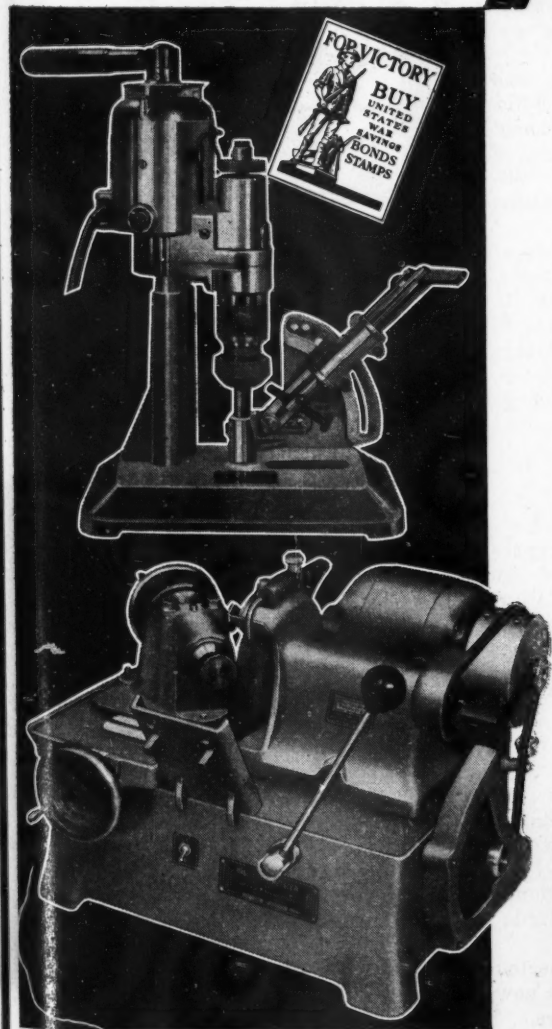


Kellogg Division
AMERICAN BRAKE SHOE COMPANY
Rochester 9, N. Y.





WHY SACRIFICE SPEED TO GET PRECISION



Valves and valve seats of finest precision and finish are of prime importance, but-- why sacrifice SPEED to obtain this precision and finish? ... HALL wet type valve refacing and ECCENTRIC valve seat grinding equipment produces the desired precision and finish FASTER... Does a job that insures better valve performance longer ... Saves precious time and cuts costs ... In HALL equipment you have the answer to every valve servicing problem.

THE HALL MANUFACTURING CO., TOLEDO 7, OHIO

HALL

WARSHAWSKY'S for Greatest Values in AUTO PARTS

REBUILT & GUARANTEED HEAVY DUTY TRANSMISSIONS



for FORD V-8
60 HP. 37-39

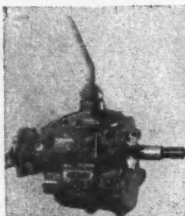
**GUARANTEED to
OUTLAST the CAR!**
Will fit without any
alterations. Has the
85 HP Straight Cut
Gears! All Worn Parts
Replaced. Ready to In-
stall—Fits Perfectly—
Nothing Else to Buy!

Included Are:—Clutch Plate, Universal
Joint and Throwout Bearing.

MA-200 ... \$27.50 MA-200 ... \$22.50
Outright, Ea. Lots of 6 Ex., Ea. \$17.50
MA-201—Same with Helical Cut Gears.
Outright ... \$37.50 Exchange ... \$32.50
Lots of 6, Ea. \$32.50 Lots of 6 Ex., Ea. \$27.50
For exchange price send prepaid old trans-
mission, clutch plate, universal joint. Your
case must not be broken.

CHEVROLET & G.M.C. EXTRA HEAVY DUTY

Rebuilt and Guaranteed—3 SPEED
Truck Transmissions



1937-42 Incl.
1/2, 3/4, & 1 Ton Models
Complete with Universal
Joints and all ne-
cessary fittings. This
is a standard Trans-
mission for which we
can supply all the
gears and other parts.
They come complete
with Shifting Lever and
fit perfectly. You have
to make one slight
change—cut your floor
board 1" larger. Your
Emergency Lever fits these Transmissions.

MA-500—Chev. 1937—1/2
ton \$32.50 each
MA-501—GMC—1937—1/2
ton \$29.50 each in
lots of 3
MA-502—Chev. 1938-39—1/2
ton \$27.50 each in
lots of 6
MA-503—GMC—1938-
39—1/2 ton
MA-504—Chev. 1940-41
and 42—1/2 ton
MA-505—GMC—1940-41
and 42—1/2 ton
MA-506—Chev. 1938—3/4
and 1 ton
MA-507—GMC—1937—3/4
to 1 ton
MA-508—Chev. 1938 to
41—3/4 to 1 ton
MA-509—GMC—1938-42—
3/4 to 1 ton
Old parts must be shipped in Prepaid.

REBUILT & GUARANTEED DISTRIBUTOR & COIL KITS



for FORD V-8
1932-1941
FITS ALL

85 & 95 Models
Eliminates the use of
the regular Ford coil.
Kit is guaranteed to
give better service than
the original. Absolutely
waterproof! Thoroughly
tested and guar-
anteed. Kit consists
of:—

- Reconditioned Universal Coil.
- Rebuilt V8 Distributor.
- Reconditioned Distributor Caps and Coil Wire.
- MA-102—Each Kit. \$5.45 Lots of 3 Kits, Ea. \$4.95
- MA-103—Each Kit. \$5.25 6 Kits \$4.95

**The ORIGINAL
WARSHAWSKY
and COMPANY**
1900-24 So. STATE ST.
CHICAGO, ILL.

Pennsylvania Dealers Elect Frey President

At its annual convention at Pitts-
burgh last month, the Pennsylvania
Automotive Trade Association elected
L. E. Frey, of Altoona, president.

E. J. Powell, of Upper Darby, and
E. C. Jones, of Reading, were chosen
vice-presidents, while A. W. Golden
of Reading, was named secretary
treasurer.

Dealers heard Pennsylvania Gov-
ernor Edward Martin predict that five
years after the war Pennsylvania
would have the "finest system of roads
in the world" when the State's \$500,-
000,000 post-war highway program
will have been carried out.

L. C. Cargile, executive committee,
NADA, predicted a tremendous out-
put of automobiles following recon-
version from war production.

Elliott Taylor, chief, Automobile
Rationing Section, OPA, said used-
car rationing was possible, but that,
contrary to rumors, a new "Victory"
model automobile would not be manu-
factured soon.

Kramer Picked to Head New Jersey Dealer Body

John M. Kramer, of Bayonne, was
elected president of the New Jersey
Automotive Trade Association, at the
recent annual meeting of the or-
ganization.

Robert M. McQuaid, of Closter, was
named first vice-president, and Peter
T. Ranere, of Hammonton, second
vice-president. John A. McCrane, of
Paterson, was chosen treasurer. Wil-
liam L. Mallon was again appointed
secretary.

The following were named trustees:
Peter T. Ranere, Robert McQuaid,
Fred Weigel, F. Earl Rickard, W. L.
Mallon, Clarence Prickett, Charles R.
Welsh, John M. Kramer, Albert
Ruckle, Arthur Stryker, Cecil S.
Hersch, Andrew Lustbaum, George
Patterson, Joseph Noone, and Harold
Burd.

Truck Men Appointed

Three more special truck repre-
sentatives have been appointed by
R. G. Hudson, manager, Truck Divi-
sion, The Studebaker Corp.

Two of these men, James A. Korne-
gay and Earl O. Smith, were pro-
moted from within the staff while the
third, George M. Bunn, is new to the
Studebaker ranks.

Kornegay has been associated with
Studebaker products since 1925. He
was district manager in the Atlanta
branch at the time of his recent ap-
pointment.

Smith had been Truck and National
Accounts Representative for Stude-
baker on the Pacific Coast.

Bunn recently has been connected
with WPB, ODT and OPA in the new
truck allocation and similar offices.

ORIGINAL EQUIPMENT MAKES THE BEST REPLACEMENT



BUNDYFLEX
Original Equipment
COPPER
COATED
METAL
TUBING



Use our handy
FLAREMASTER
Flaring Tool for a perfect
double-lap flare.

- BUNDYFLEX is always better than cop-
per tubing for automotive installations.
- BUNDYFLEX is standard equipment on
G-M, Ford, Chrysler, Studebaker, Nash,
Mack, Diamond-T and other leading
cars and trucks.
- BUNDYFLEX is stronger than copper
tubing with far greater resistance to
vibration fatigue—therefore gives more
lasting service.

IMMEDIATE DELIVERY
25-ft. Coils, 1/4" to 3/4", for
brake lines, oil lines, fuel
lines, etc.

ASK YOUR JOBBER

EVERHOT PRODUCTS CO
2055-59 W. CARROLL AVE.
CHICAGO, ILL., U.S.A.



Good Will in Good Hands!

The most priceless thing at Ford is *good will*. Without it we couldn't stay in business. And when we think about our friends, we're mighty grateful to Ford dealers who have helped us make and keep them. You haven't had things too smooth lately. A lot of your best men have gone into the Service. There are no new cars to sell. It's hard to get parts and materials. But you have carried on . . . more than 90% of the dealers we had two years ago are still with us, serving the public honestly, efficiently and economically. We take our hats off to you for keeping the Ford name a symbol of service in its broadest, finest sense. We think our *good will* is in mighty *good hands*.

F O R D M O T O R C O M P A N Y

HEIL HITLER

Say it with
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**RENDER A BETTER
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**BRAKE
PARTS**

EIS MANUFACTURING CO., INC.
MIDDLETOWN, CONN.

4 Elected to MEMA Board

A. H. Eichholz, MEMA general manager, has announced that at the annual members' election of directors, the following were made members of the board of directors of the Motor & Equipment Manufacturers Association for the three-year term of 1944-1945-1946:

A. B. Bussmann, president, Bussmann Manufacturing Co., St. Louis, Mo.

Will Dammann, president, Bear Manufacturing Co., Rock Island, Ill.

H. S. Powell, president, Powell Muffler Co., Utica, N. Y.

L. E. Russell, president, Peters and Russell, Inc., Springfield, Ohio.

Army-Navy "E" Awards

Wagner Electric Corp., St. Louis, Mo. (Star)

Raybestos Division, Raybestos-Manhattan, Inc., Bridgeport, Conn.

Metal Manufacturing Co., Long Island City, N. Y.

Seiberling Rubber Co., Akron, Ohio (Star)

McCord Radiator and Manufacturing Co., Detroit, Mich. (4th Star)

Weatherhead Co., Cleveland, Ohio.

The Ken-Tool Mfg. Co., Akron, Ohio.

Independent Pneumatic Tool Co., Aurora, Ill. (2d Star.)

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- ② All the gas you want when you want it. No delivery delays from bottlers.
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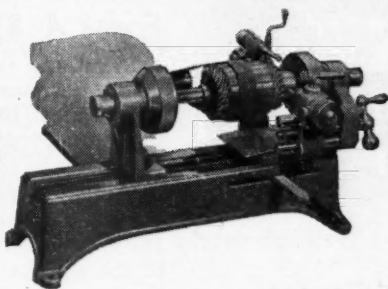
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CHICAGO DALLAS MONTREAL

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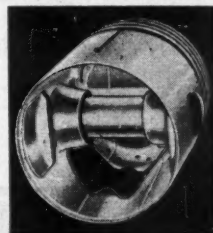


MASTER RECAMS prolong the life of pistons, save oil and conserve vital war materials. They quiet noisy motors.

STOP PISTON SLAP
OIL PUMPING and
MOTOR NOISE

Easy to install in late model cars.

**ONLY
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EACH**



To Get Quick Action—

As territory men are handicapped by tire and gasoline restrictions, please write or wire for illustrated folder and full information and **MAIL YOUR ORDER.**

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Seattle, Wash., 1005 E. Pike St.
Toronto, Ontario, Canada, 191 Queen St.
San Francisco, 440 Golden Gate
Chicago, 2618 S. Michigan Ave.

NO FOULING

WARTIME restrictions on speed and mileage make it doubly necessary to install the right plug in the job.

Check each installation and make sure the plug installed is hot enough to take care of today's conditions. Leonard gives you the right type of plug for all wartime driving conditions. Use Leonards—they'll save gas, help to eliminate fouling and put an end to frequent replacements.

Let our Engineers solve your spark plug problems. LEONARD SPARK PLUG CO., INC., NEWARK, N. J.



Leonard flat-edged electrodes with spark gap control make frequent regapping unnecessary.

LEONARD ^{PATENTED} air Cooled SPARK PLUGS

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ENGINEERED SET
of PISTON RINGS
FOR EVERY CAR, TRUCK,
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Emergency Anti-Freeze

Even though motorists may not be able to buy the same type of anti-freeze that they purchased a year ago, they are urged not to discard the solutions saved from last season if the solutions remain suitable for re-use.

The Ammonia Department of E. I. du Pont de Nemours & Co., in making the announcement, said it must be understood, of course, that the "duration emergency method" has its limitations. In using two different types of anti-freeze compounds in the cooling system, no hydrometer test will determine the freezing point of the resulting solution. Accordingly, simple directions must be followed closely to obtain desired protection. First, the motorist should determine the freezing point of the contents of the cooling system to which the emergency compound is to be added. This may be done with the hydrometer for the particular type of compound used last year. Charts at service stations will disclose, opposite this freezing point, the number of quarts of anti-freeze still left in the system.

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Write down the number of quarts. The charts will show the number of quarts of war emergency compound that would be needed to safeguard your car down to specified temperatures, if you were putting a fresh charge into an unprotected system. Write down the number of quarts for a completely new charge, then subtract. The difference, plus one quart, is the amount of war-emergency compound that should be added to insure the specified protection.

Frank A. Ross

Frank A. Ross, senior vice president of Stewart-Warner Corp., died Nov. 17 at Chicago. He was 60, having been born in Joliet, Ill., May 1, 1883.

In point of service Ross was the oldest executive with the corporation. He grew up with it, having been one of the nucleus around which the company was formed. His career as one of the outstanding engineers in the automotive and allied accessories field began in 1908 as a member of the Warner Instrument Co., Beloit, Wis., where he was an engineer.

With the formation of the Stewart-Warner Speedometer Corp. in 1912, which was formed by the consolidation of the Stewart-Clark Co. and the Warner Instrument Co. Ross went to Chicago as experimental engineer. In rapid succession he became assistant superintendent and then superintendent and works manager of the new corporation.

Ross was largely responsible for the successful and widespread use of the vacuum tank on automobiles.

Joins Battery Firm

H. King, vice-president in charge of sales of the Gould Storage Battery Corp., Depew, N. Y., has announced the appointment of J. H. Hamilton as sales representative for Gould in the San Francisco territory. Hamilton will have his offices at 478 Flood Building, San Francisco, Cal.

This



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HERE'S WHY!

If wheels are not balanced, the tires drag, scrape and hop-skip-and-jump, leaving a trail of precious rubber on the road. Call this to the attention of your customers. It means many extra service jobs.

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for wall chart showing how unbalance wears out tires.



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No motor will perform at top efficiency unless all the valve springs are at correct and uniform tension. A valve grinding job is not complete unless all the springs are "balanced".

RIMAC VALVE SPRING TESTER

For Valve and Clutch Springs

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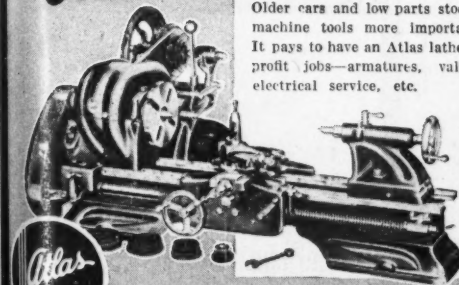
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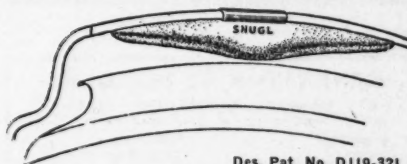
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"Largest dismantlers and salvagers of Automotive Generators and Starters"

David Beecroft

David Beecroft, 68, pioneer figure in the automotive industry publishing field and treasurer and past president of the Society of Automotive Engineers, died Nov. 5 at South Bend, Ind.

Mr. Beecroft began his automotive career in 1902 as editor of the *Automotive Review*. He was editor of *Motor Age* and later editorial director of *MOTOR AGE*, *Motor World*, and *Automotive Industries*. He left the editorial field in 1928 to become associated with the Bendix Corp., predecessor of the present Bendix Aviation Corp.

Mr. Beecroft was associated with the Bendix organization throughout the intervening 15 years, serving in various executive capacities. At one time he was a member of the corporation's board of directors and assistant secretary.

He was active in the contests and road races which marked early development of the automobile. He drafted the first stock-car racing rules and was long a member of the contest board of the American Automobile Association. In 1911 Mr. Beecroft joined the Society of Automotive Engineers, later served as president and then treasurer of that organization. He was one of the founders of the Automobile Old Timers' Club, serving successively as director, vice-president and executive committee member. He also was among the founders of the Chicago Motor Club.

Mr. Beecroft was born July 17, 1875, in Ontario, Canada.

Sees Parts Crisis Past

District managers of the American Hammered Piston Ring Division of Koppers Co. gathered in Baltimore, Nov. 4-6, for their annual sales conference with T. Latimer Ford, sales manager of the Automotive Department, and other plant officials, after which the meetings adjourned to Chicago, where A-H territorial service engineers joined the group for additional sessions and attendance at the NSPA War-time Planning Conferences.

"We do not expect 'business as usual' as long as the war lasts," said Ford, who also is chairman of the War Industries Committee of the NSPA, "but we do expect to be able to fill orders in 1944, even on a basis of the expected unprecedented demand."

"I am convinced that we are over the hump, for two reasons. First, the pipe line of needed replacements has been filled, which will ease up the situation generally. Second, through the efforts of those who have never let down in their battle on the Washington front, there is now a definite understanding among government agencies as to the vital part automotive transportation has in the winning of the war."

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The standard of the industry. Quick-tightening, perfect leak-proof hose connections, for original equipment and replacement. For Radiator, Heater, Booster Brakes and High Pressure hose connections. Wittek Manufacturing Co., 4305-15 W. 24th Place, Chicago, Ill.

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SPEED UP YOUR HYDRAULIC BRAKE CYLINDER REPAIR WORK

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YOUR MECHANICS can eliminate wasteful trips to have brake cylinders honed. Do this job in your own shop. The tool will service 80% of cars manufactured and sells for \$3.25 from your jobber and is available on an AA5 priority rating or higher.

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Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts...
Contact Points...
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SHURHIT PRODUCTS, INC.
Waukegan, Ill.

Dealer Advisers Named

To work with it on automobile rationing problems, the car rationing branch of the OPA has appointed 30 volunteer consultants, representing individual dealers, local dealer associations, and the NADA.

The dealer consultants are:

Fred Ordway, Boston; Frank Diver, Wilmington, Del.; D. E. Wagstaff, Atlanta; William Reagan, Chicago; John Rechten, Decatur, Ill.; Roland Record, Kansas City, Mo.; John Fleck, Bismarck, N. D.; I. W. Walls, Dallas; William Ryan, Seattle; George Wallace, Portland, Ore.; Glenn Smallcomb, Burlingame, Cal.; Spencer Honig, Los Angeles; L. F. Jacod, New York; William Shore, Philadelphia; P. D. Foster, Birmingham, Ala.; Bert Baker, Detroit; A. M. Hussey, New Orleans; Liston Zander, San Antonio; George H. Evans, Denver; and Frank Taylor, Los Angeles.

The local association men are:

W. A. Williamson, Texas Automotive Automotive Dealers; R. Earl Burrows, Cleveland Automotive Trade; Burt Roberts, Los Angeles Motor Cars Dealers; Edward Cleary, Chicago Automobile Trade; Claude Klugh, Pennsylvania Automotive; J. A. Schlect, Missouri Auto Dealers; C. E. Anderson, Automobile Dealers of Alabama; Tom Braden, Colorado Motor Car Dealers.

Ray Chamblerrain and Charles Bishop will represent the NADA.

Anti-Freeze Ban Eased

The sale of certain petroleum-base anti-freeze has been permitted by the War Production Board. This action was taken after the Appeals Board of the WPB had granted three exceptions to the terms of Limitation Order L-258, which prohibits manufacturers and sale of salt and petroleum types of anti-freeze.

The exceptions were granted to the Great Northern Chemical Co., Oak Park, Ill., manufacturer of "No-Freeze;" Motoroyal Oil Co., Denver, Colo., which makes "Freeze-Proof" and the Middle States Mfg. Co., Salt Lake City, Utah, producers of "Safas."

The products sold under these trade names are refined petroleum base anti-freeze solutions.

Con Rod Borer-Grinder

A new machine for precision reconditioning of car, truck, and tractor con-rod forgings, up to 5 in. in diameter, is announced by the Automotive Division of the Van Norman Machine Tool Co., Springfield, Mass. This machine, designated as No. 222, will also bore semi-finished babbitt rods to size, and will likewise quickly bore accurate wrist-pin holes in exact alignment with the rod.

Full details on the new Van Norman No. 222 Con-Rod Boring and Grinding Machine may be obtained from the manufacturers.

BLUE CROWN SPARK PLUGS

Air Cooled

Always Dependable for Severe Service

Finned Shell SAVES GAS

LARGER ELECTRODES GIVE LONGER LIFE

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Thermoid Thermodized PRE-STRETCHED FAN BELTS

STOP TROUBLE BEFORE IT STARTS



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This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

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